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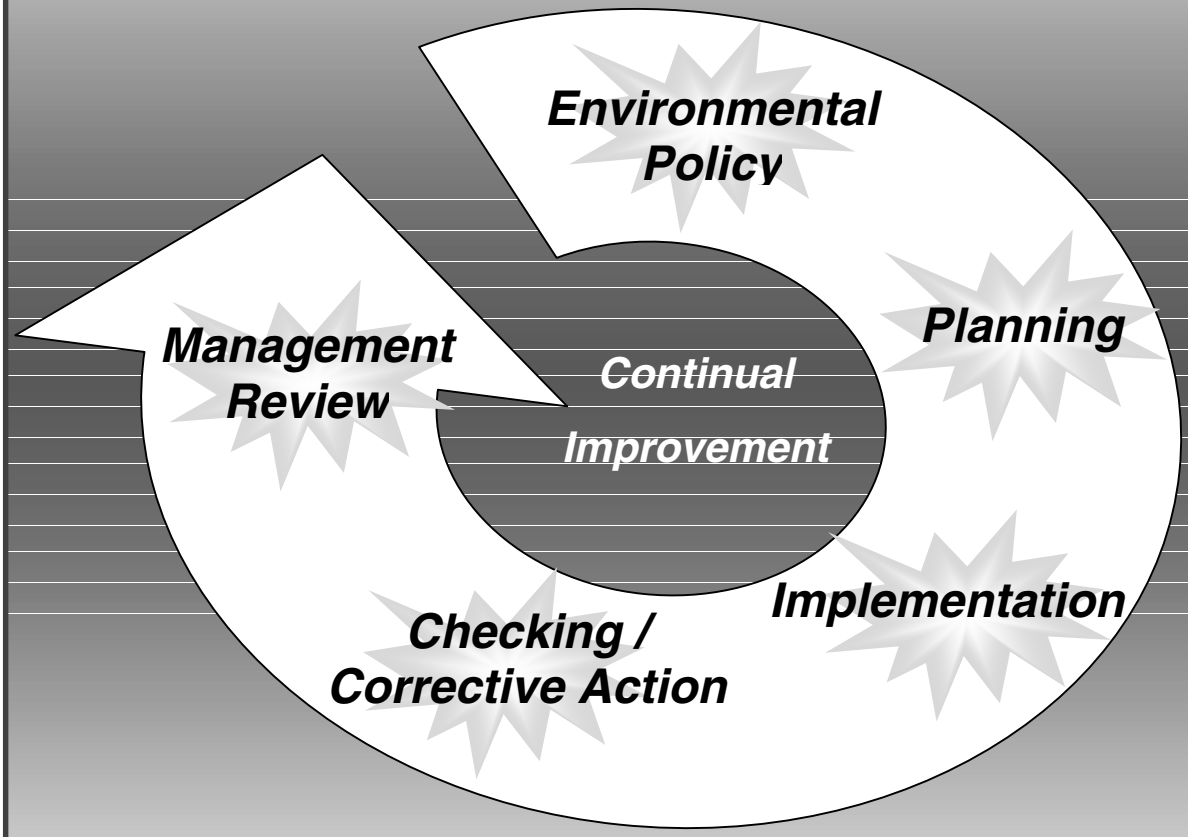
Second Edition

Environmental Management Systems:

An Implementation Guide for Small and Medium-Sized Organizations



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Environmental Management Systems:

An Implementation Guide for Small and Medium-Sized Organizations

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Acknowledgments

When the first edition of this Guide was published in November 1996, the use of environmental management systems (EMS) was a relatively new, but rapidly expanding phenomenon. Considerable experience in EMS design and implementation has been gained since the first edition of this Guide was published. The authors' primary goal in preparing this second edition of the Guide was to take advantage of the many new developments in the EMS field as well as the insights and experiences of many organizations that have implemented EMS over the past few years.

As with the first edition of this Guide, the second edition was prepared by NSF International with funding through a cooperative agreement with the U.S. Environmental Protection Agency's Office of Wastewater Management and Office of Compliance.

In preparing the second edition, the authors solicited input from a variety of organizations that used the Guide in various EMS planning and implementation activities. In particular, the authors would like to thank the following individuals for sharing experiences and insights on their use of the first edition of the Guide. Feedback from the user community was very helpful in framing the changes that are reflected in this second edition.

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Second Edition

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CONTENTS

CONTENTS *(continued)*

Introduction to Second Edition

The first edition of this Guide was published in November 1996. Like its predecessor, this second edition is designed to explain environmental management system (EMS) concepts and to support and facilitate the development of EMS among small and medium-sized organizations. The Guide describes how an organization of any type can develop and implement an effective EMS and how such a system can support an organization's mission and goals. Development and implementation of an EMS is a **voluntary** approach to improving environmental performance. Over the past few years, a variety of public and private sector organizations have implemented EMS and their numbers grow daily. These organizations report a number of important EMS benefits, as described in this Guide.

A number of changes were made in this edition of the Guide to improve its usefulness and to reflect EMS experience gained over the last four years. In particular, the authors have provided additional information on certain EMS elements that many organizations have found to be particularly challenging – including environmental aspects, communications and operational controls, among others. Sections 3 through 5 have been reconfigured into a new "Ready-Set-Go" format. The new Section 5 (GO!) has been added to provide a "roadmap" or logical sequence for implementing the key elements of an EMS. In addition, examples of implementation practices from public sector and service based-organizations have been added to help demonstrate the value of EMS in these sectors.

This Guide is designed primarily for use by EMS **implementers —** the people within a small or medium-sized organization that will lead the EMS development effort. The heart of the Guide is found in **Section 4**, "Key Elements of an EMS." For each of the critical EMS elements, this section describes the importance of the element, how to get started on implementation, and other key suggestions. In addition, examples of how various organizations have addressed various EMS elements are provided in Section 4. For this second edition, worksheets have been added for each EMS element to help users "capture the learning" as they progress from one EMS element to the next. These worksheets can be used to summarize and evaluate existing management processes, and to initiate needed improvements and help maintain implementation momentum.

The Guide continues to use the ISO 14001 Standard as one important EMS model. ISO 14001, published in November 1996, is the most widely accepted international standard for EMS. However, other EMS models also exist and might be useful to some organizations. These other models are described in the Guide. For example, EPA's National Environmental Performance Track program describes certain EMS criteria that (in some cases) go beyond the requirements of ISO 14001, but from which users might derive certain benefits. More information on EPA's Performance Track program can be found in ***Appendix B***, as well as in other relevant sections of the Guide.

This Guide is **not** intended for use by registrars (or others) for registration purposes, nor is it intended to provide specific interpretations of the ISO 14001 Standard.

How this Guide is Organized

Section 1: **Why Your Organization Should Have an EMS**	Describes the many benefits of an EMS and how such a system can help your organization to compete and prosper in today's global marketplace.
Section 2: **Key EMS Concepts**	Summarizes overall management systems concepts. This section explains what a management system is and what must be in place for a successful EMS.
Section 3: **Initial EMS Planning**	Describes the initial process for planning an EMS and recommends some steps in the overall EMS planning effort.
Section 4: **Key Elements of an EMS**	Provides detailed guidance on how each element of your EMS should be designed and implemented. Discusses each of the key elements of an EMS and suggests how to put them in place.
Section 5: **Roadmap for EMS Development**	Describes a sequence of events or "roadmap" for implementing the key elements of an EMS and explains why the implementation of some elements should precede others.
Appendices	Describe sources of EMS information and related EPA programs. Also describe the process for registering an EMS and selecting and working with a registrar. In addition, the **Tool Kit** provides sample EMS policies, procedures and other tools that your organization can tailor to fit its EMS needs. The sample procedures are adapted from actual EMS procedures used by organizations that have implemented EMS.

Use of Icons

A variety of icons are used in this Guide to highlight key concepts and suggestions for the reader. A few of these icons include:

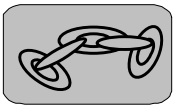
The light bulb is used to highlight **EMS examples and experiences** from various organizations.

The hand is used to point out **hints** for implementing EMS elements.

The key is used to indicate **keys to successful EMS implementation**, as identified by various organizations.

The speech balloon is used to indicate **quotes** from representatives of organizations that have implemented an EMS, as well as **definitions** from various sources (including ISO 14001).

The Tool Box icon is used to highlight **references to useful examples of tools** and forms that are found in Appendix A (the Tool Kit).



The Links icon is used to summarize **critical linkages among EMS elements**.

Section 1: Why Your Organization Should Have an EMS

A systematic approach to meeting your environmental and other organizational goals

Key EMS Benefits

- ☑ improved environmental performance
- ☑ reduced liability
- ☑ competitive advantage
- ☑ improved compliance
- ☑ reduced costs
- ☑ fewer accidents
- ☑ employee involvement
- ☑ improved public image
- ☑ enhanced customer trust
- ☑ more favorable credit terms
- ☑ meet customer requirements

"We view the establishment of an EMS as a process that forces us to better organize our priorities and projects and to identify problems and exposures before they occur."

- K.J. Quinn & Co., a small specialty chemical company

Does your organization need an EMS? Well, ask yourself the following questions:

- Is your organization required to comply with **environmental laws and regulations**?
- Are you looking for ways to improve your **environmental performance**?
- Is the state of your organization's environmental affairs a significant **liability**?
- Does a **lack of time or resources** prevent your organization from managing its environmental obligations effectively?
- Is the relationship between your organization's **environmental goals** and other business goals unclear?

If you answered YES to one or more of the above questions**,** an **EMS can help your organization — and so will this Guide!**

As one of your organization's leaders, you probably know that interest in environmental protection and sustainable development is growing each year. You might hear about these issues from your customers, the public or others. Like many, your organization may be increasingly challenged to demonstrate its commitment to the environment**.** Implementing an EMS can help you **meet this challenge** in several important ways.

First, an effective EMS makes good **business** sense, whether your organization is in the public or private sector. By helping to identify the **causes** of environmental problems and then **eliminate** them, an EMS can help you **save money**. Think of it this way:

- ❖ Is it better to **make a product right the first time** or to perform a lot of re-work later?
- ❖ Is it cheaper to **prevent a spill in the first place** or clean it up afterwards?
- ❖ Is it more cost-effective to **prevent pollution** or to manage it after it has been generated?

"We found that an EMS could improve employee retention, new hire selection, working conditions, and the perceptions of our customers, suppliers, lenders, neighbors, and regulators."

- Milan Screw Products, a 32-person manufacturer of precision fittings

Second, an EMS can be an **investment in long-term viability** of your organization. An EMS can help you to be more effective in achieving environmental goals. And, by helping businesses to keep existing customers and attract new ones, an EMS **adds value.**

Here's some good news: Much of what you need for an EMS may **already be in place!** The management system framework described in this Guide includes many elements that are common to **managing other business processes**, such as quality, health & safety, finance, or human resources. As you review this Guide, you will probably find that your organization has many EMS processes in place, even though they may have been designed for other purposes. Integrating environmental management with other key business processes can improve financial, quality **and** environmental performance.

The key to effective environmental management is the use of a **systematic approach** to planning, controlling, measuring and improving an organization's environmental performance. Potentially significant environmental improvements (and cost savings) can be achieved by reviewing and improving your organization's **management processes**. Many environmental "problems" can be solved without installing expensive pollution control equipment.

Some reasons that municipalities have implemented an EMS:

- ☑ • Compliance obligations
- ☑ • Enhanced management confidence
- ☑ • Increased efficiency
- ☑ Public image concerns
- ☑ Growth management
- ☑ Desire to be seen as leaders and innovators

Of course, there is some work involved in planning, implementing and maintaining an EMS. But many organizations have found that the development of an EMS can be a **vehicle for positive change**. Many organizations have seen that the benefits of an EMS far outweigh the potential costs *(see next page)*. And while these EMS concepts certainly apply to the private sector, a number of **public sector** organizations (including some municipalities) have found that can benefit from an EMS.

In the Total Quality Management (TQM) world, they say "quality is free" — as long as you are willing to make the investments that will let you reap the rewards. The same holds true for environmental management.

Want to know more about EMS costs and benefits? *Then read on …*

Frequently Asked Questions about EMS

EPA encourages the use of EMS that improve compliance, pollution prevention and other forms of environmental performance. The Agency is assessing how an EMS can be used to strengthen environmental programs and policies.

"We needed a system to manage things that came up in a consistent way. Our area is growing and an EMS will help us handle development issues such as controlling soil erosion and preserving the natural features of the area. An EMS is a way to control environmental problems in a rapidly growing community."

Steve Daut, Council Trustee
Village of Chelsea, Michigan

1. *We already have a compliance program – why do we need an EMS?*

An EMS can help you to comply with regulations more consistently and effectively. It also can help you identify and capitalize on environmental opportunities that go beyond compliance.

2. *How big does an organization need to be to successfully implement an EMS?*

EMS have been implemented by organizations ranging in size from a couple of dozen employees to many thousands of employees. The elements of an EMS (as described in this Guide) are flexible by design to accommodate a wide range of organizational types and sizes.

3. *Is an EMS going to cost us a lot of money?*

The actual cost will depend on many factors, but most of the investment in an EMS is the time of people within the organization. An EMS need not be expensive if carefully planned and implemented.

4. *To implement an EMS, do we have to start from scratch?*

Much of what you have in place now for environmental management probably can be incorporated into the EMS. There is no need to "start over".

5. *How will an EMS affect my existing compliance obligations?*

An EMS will not result in more stringent legal compliance obligations. In fact, an EMS should improve your compliance efforts, and, in some cases, may lead to more flexible compliance requirements. (See discussion of EPA Performance Tracks in **Appendix B**.)

6. *Do we need to be in 100% compliance in order to have an EMS?*

The concept of continual improvement assumes that no organization is perfect. While an EMS should help your organization to improve its compliance and other measures of performance, this does not mean that problems will never occur. However, an effective EMS should help you find and fix these problems and prevent their recurrence.

EMS Costs and Benefits

POTENTIAL COSTS	POTENTIAL BENEFITS
Internal • Staff (manager) time • Other employee time (**Note**: Internal labor costs represent the bulk of the EMS resources expended by most organizations) **External** • Potential consulting assistance • Outside training of personnel	• Improved environmental performance • Enhanced compliance • Prevention of pollution/resource conservation • New customers / markets • Increased efficiency / reduced costs • Enhanced employee morale • Enhanced image with public, regulators, lenders, investors • Reduced training effort for new employees

If your organization already has or is considering a quality management system (based on ISO 9001, for example), you will find significant synergy between what you need for **quality** management and for **environmental** management (see below).

Some Common Aspects of Quality and Environmental Management Systems

- Quality Policy
- Adequate Resources
- Responsibilities and Authorities
- Training
- System Documentation
- Process Controls
- Document Control
- System Audits
- Management Review

- Environmental Policy
- Adequate Resources
- Responsibilities and Authorities
- Training
- System Documentation
- Operational Controls
- Document Control
- System Audits
- Management Review

One final note: Small and medium-sized organizations often have certain **advantages** over larger organizations in ensuring effective environmental management. In smaller organizations, lines of communication are generally shorter, organizational structures are less complex, people often perform multiple functions, processes are generally well understood, and access to management is simpler. These can be real advantages for effective environmental management.

Are you interested in learning more about how an EMS can help your organization? If so, let's look at some key management systems concepts and how they are applied in the environmental area.

Section 2: Key EMS Concepts

The focus on quality principles

An EMS is:
A continual cycle of **planning**, **implementing**, **reviewing and improving** the processes that an organization implements to meet its environmental obligations.

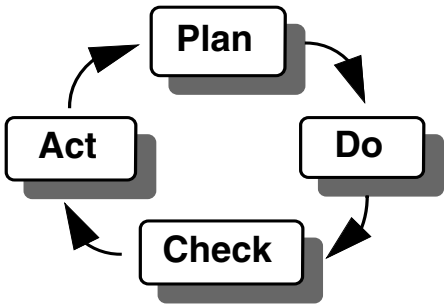
You have probably heard of **Total Quality Management** (TQM). Your organization may apply TQM principles to some or all of its operations and activities.

An effective EMS is built on TQM concepts. To improve environmental management, your organization needs to focus not only on **what** things happen but also on **why** they happen. Over time, the systematic identification and correction of system deficiencies leads to better environmental (and overall organizational) performance.

Most EMS models (including the ISO 14001 standard, which will be described later) are built on the "Plan, Do, Check, Act" model introduced by Shewart and Deming. This model endorses the concept of **continual improvement**.

Continual Improvement:
Enhancing your EMS to better your overall environmental performance

Figure 1



In the EMS model described in this Guide, these "Plan, Do, Check, Act" steps have been expanded into seventeen elements that are **linked together**. These elements and their linkages are discussed in **Section 4**.

Some of the **keys** to a successful EMS include:

An effective EMS doesn't just happen. An effective EMS needs ongoing and visible management support

Top Management Commitment
Applying TQM principles to the environmental area and providing adequate resources are the job of **top management**. To initiate and sustain the EMS effort, top management must communicate to all employees the importance of :

- **making the environment an organizational priority** (thinking of effective environmental management as fundamental to the organization's survival)
- **integrating environmental management throughout the organization** (thinking about the environment as part of product/service and process development and delivery, among other activities)

"Top management" is the person or group with executive responsibility for the organization"

- **looking at problems as opportunities**
(identifying problems, determining root causes and preventing problem recurrence)

Focus on Continual Improvement

No organization is perfect. The concept of continual improvement recognizes that problems will occur. But a committed organization **learns from its mistakes** and **prevents** similar problems from recurring.

Flexible & Simple = Adaptable & Understandable

Flexibility

An effective EMS must be **dynamic** to allow your organization to adapt to a quickly changing business environment. For this reason, you should keep your EMS flexible and simple. This also helps make your EMS **understandable for the people who must implement** it — your organization's managers and other employees.

Some organizations have found that an effective EMS allows them to design pollution and other environmental impacts out of their products, services and operations. This can save money and reduce liability.

Compatibility with Organizational Culture

The EMS approach and the organization's culture should be compatible. This gives you two options: (1) tailor your EMS to the culture, or (2) change the culture to be compatible with the EMS approach. Bear in mind that changing an organization's culture can be a long-term process. Keeping this compatibility issue in mind will help you ensure that the EMS will meet your organization's needs.

Employee involvement is crucial. An effective implementation team is pivotal to the success of many organizations.

Employee Awareness and Involvement

As you design and implement an EMS, roadblocks may be encountered. Some people may view an EMS as bureaucracy or extra expense. There also may be resistance to change or fear of new responsibilities. To overcome potential roadblocks, make sure that everyone understands **why** the organization needs an effective EMS, **what** their role is and **how** an EMS will help to control environmental impacts in a cost-effective manner. Employee involvement helps to demonstrate the organization's commitment to the environment **and** helps to ensure that the EMS is realistic, practical and adds value.

Building or improving your EMS (with the help of this Guide) is a great opportunity to assess how your organization manages environmental obligations and to find better (and more cost-effective) solutions. While you will probably identify some areas where your current EMS can be improved, this does **not** mean that you should change things that are working well! By reviewing what your organization does and how well it works, you can ensure that your EMS will be viable and effective, both now and in the future.

An EMS should integrate environmental management into day-to-day operations as well as strategic decisions. It can make the environment the responsibiity of <u>every</u> employee.

Don't get discouraged if your system has some bugs at first — this is to be expected. Remember that the focus is on *continual improvement!*

Section 3: READY! (Initial EMS Planning)

Putting the theory of EMS into practice

Building an EMS might sound like an overwhelming task for a smaller organization, but it need not be. Since time and other resources are limited in any organization, it is important that you use resources wisely. One way to do this is by preparing and following a simple, effective **plan**. Fortunately, you can build on the experiences of other organizations that have already implemented an EMS. Examples are provided throughout this Guide.

Milan Screw Products found that the use of a cross-functional team (the environmental task group) was the key to progress in evaluating and implementing their EMS. Participation of line managers and employees is essential in successfully implementing an EMS.

Figure 2 illustrates the initial steps in the EMS planning process. The importance of careful planning cannot be overemphasized. Taking the time to figure out **what** you need to do, **how** you will do it, and **who** must be involved will pay big dividends down the road.

Experiences shows that using a **team approach** for planning and building an EMS is an excellent way to promote commitment and ensure that your objectives, procedures and other system elements are realistic, achievable, and cost-effective. Ideas for using a team and involving employees are discussed in this section.

A few **hints** to keep in mind as you build your EMS:

Appendix F has information on EMS resources

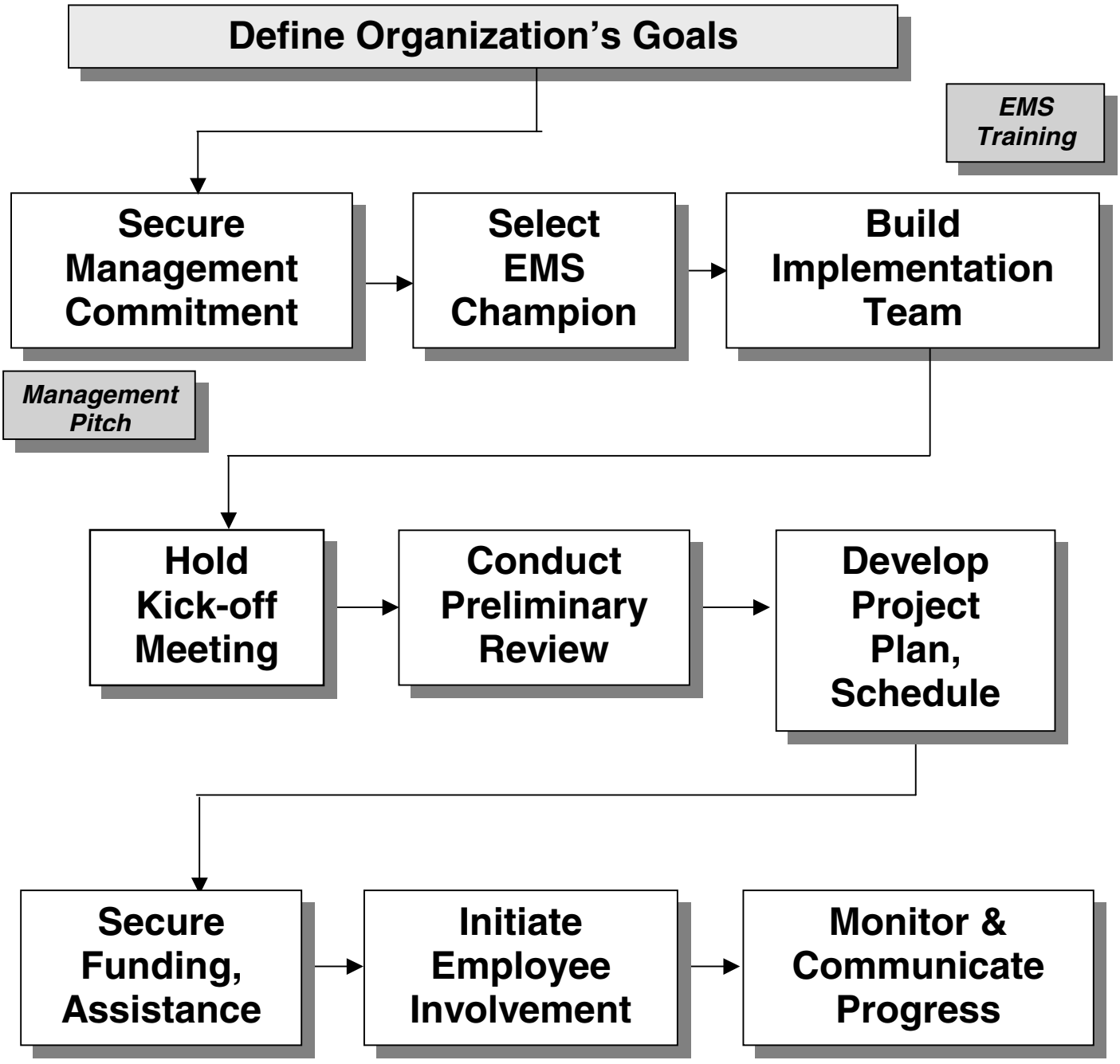
- Help is available — don't hesitate to use it. (See **Appendix F** for information on EMS resources.)
- Pace yourself. Move quickly enough that employees stay interested and engaged, but not so fast that those involved are overloaded or that the effort becomes superficial.
- Don't re-invent the wheel -- existing management practices should help you to meet EMS requirements.

K.J.Quinn & Company found that it could perform an initial assessment of its environmental programs in 20-25 hours

- Consultants can help you evaluate your EMS and suggest approaches used successfully elsewhere. Explore ways to hold consulting costs down. You may be able to join forces with other organizations to hire a consultant or sponsor a training course.

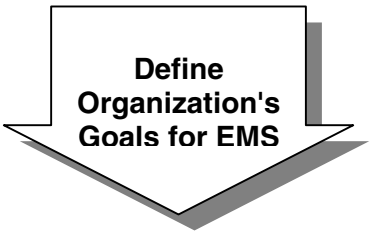
Some Thoughts on Using Consultants
• Assess your own in-house resources first.
• Ensure both parties understand the scope of work.
• Get references and check them. Look for consultants with experience in small business and your specific industry.
• Use consultants to gain insights on approaches used by other organizations.
• An EMS developed by consultants "in isolation" will not work. Your own people need to be involved in the EMS development process.

FIGURE 2. INITIAL EMS PLANNING STEPS



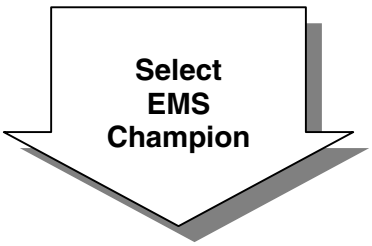
READY!

Laying the Groundwork for an EMS: Key Steps

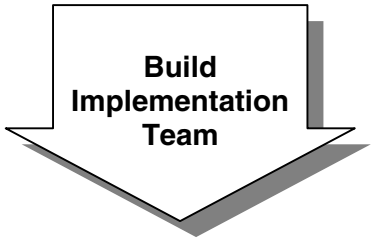


A first step in EMS planning is to **decide why you are pursuing the development of an EMS**. Are you trying to improve your environmental performance (for example, comply with regulations or prevent pollution)? Are you trying to promote involvement throughout the organization? Are you satisfying a customer requirement? Write your goals down and refer back to them frequently as you move forward. As you design and implement the EMS, ask: How is this task going to help us achieve our goals? This also is a good time to define the **project scope** or **"fenceline**" (i.e., what is the "organization" that the EMS will cover? One location? Multiple locations?).

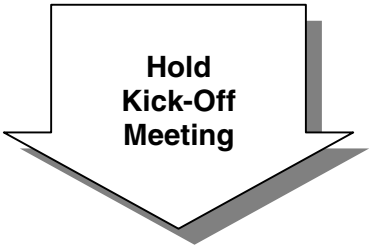
One of the most critical steps in the planning process is **gaining top management's commitment** to support EMS development and implementation. Management must first understand the benefits of an EMS and what it will take to put an EMS in place. Explain the strengths and limitations of your current approach and how those limitations affect the organization's financial and other performance. Management also has a role in ensuring that the **goals** for the EMS (see above) are clear and consistent with other organizational goals. Management's commitment should be communicated across the organization.



Not all small- or medium-sized organizations have the luxury of choosing among multiple candidates, but your choice of **project champion** is critical. The champion should have the necessary authority, an understanding of the organization, and project management skills. The champion should be a "systems thinker" (ISO 9000 experience can be a plus, but is not necessary), should have the time to commit to the EMS-building process and must have top management support.



A **team** with representatives from key management functions (such as engineering, finance, human resources, production and/or service) can identify and assess issues, opportunities, and existing processes. Consider including contractors, suppliers or other external parties to be part of the project team, where appropriate. The team will need to meet regularly, especially in the early stages of the project. A cross-functional team can help to ensure that procedures are reasonable and can build commitment to and "ownership" of the EMS.



Once the team has been selected, **hold a kick-off meeting** to discuss the organization's objectives in implementing an EMS, the steps that need to be taken initially, and the roles of team members, among other topics. If possible, get top management to describe its commitment to the EMS at this meeting. The kick-off meeting also is a good opportunity to provide some

more…

Creating Your Own EMS (cont'd.)

EMS training for team members. Follow-up this meeting with a communication to all employees.

Conduct Preliminary Review

The next step is for the team to conduct a **preliminary review** of your current compliance and other environmental programs and system and to compare these against the criteria for your EMS (such as ISO 14001, EPA Performance Track, etc.). Evaluate your organization's structure and its procedures, policies, environmental impacts, training programs and other factors. Determine which parts of your current EMS are in good shape and which need additional work.

Prepare Budget and Schedule

Based on the results of the preliminary review, prepare a **project plan and budget**. The plan should describe in detail what key actions are needed, who will be responsible, what resources are needed, and when the work will be completed. Keep the plan flexible, but set some stretch goals. Think about how you will maintain project focus and momentum over time. Look for some potential "early wins" that can help to build momentum and reinforce the benefits of the EMS.

Secure Funding, Assistance

The plan and budget should be reviewed and **approved by top management**. In some cases, there may be **outside funding or other types of assistance** that you can use (from a trade association, a state technical assistance office, etc.). See Appendix F for more ideas on possible sources of help.

Involve Employees

Employees are a great source of knowledge on environmental and health & safety issues related to their work areas as well as on the effectiveness of current processes and procedures. They can help the project team in drafting procedures. **Ownership** of the EMS will be greatly enhanced by meaningful employee involvement in the EMS development process.

Monitor and Communicate Progress

As you build the EMS, be sure to regularly **monitor your progress** against the project plan and to **communicate** this progress within the organization. Be sure to communicate the **accomplishments** that have been made and what happens next. Build on your small successes. Be sure to keep top management informed and engaged, especially if additional resources might be required.

Advertise your successes to keep management and employees aware of your EMS efforts. Document benefits, no matter how small they may seem at the time. As this list grows, so will EMS support.

Section 4: SET! (Key Elements of an EMS)

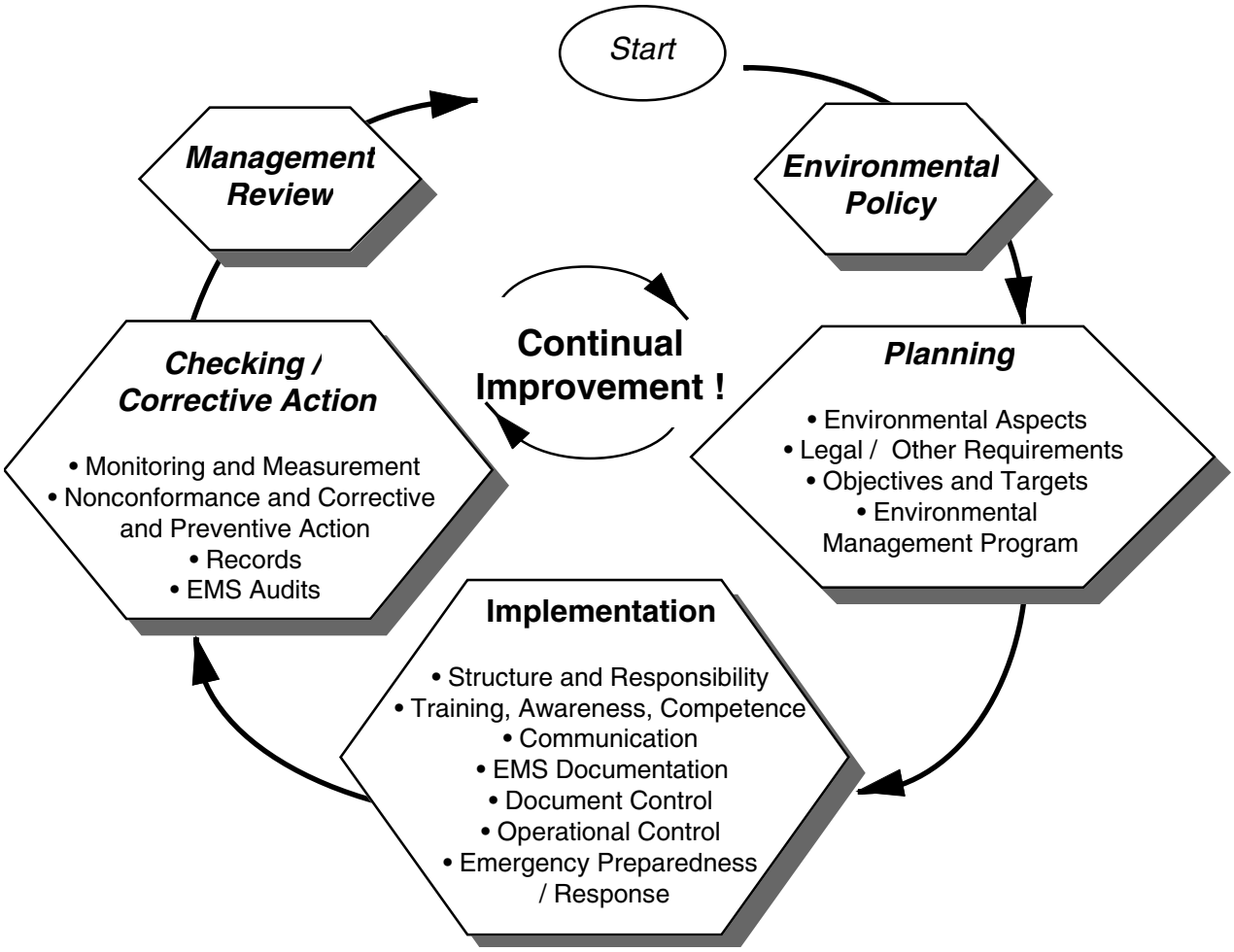
What does an EMS consist of? How are these elements linked together?

As mentioned earlier, your EMS should be built on the "Plan, Do, Check, Act" model to ensure that environmental matters are systematically **identified, controlled, and monitored**. Using this approach will help to ensure that performance of your EMS **improves** over time and that you meet your objectives for implementing an EMS in the first place.

This section describes seventeen EMS elements that are common to most EMS models. This section also notes the **key linkages** among these elements. While there are several good EMS models available, this Guide generally uses the ISO 14001 Standard as a starting point for describing EMS elements for several reasons:

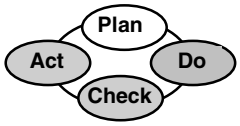
- ISO 14001 is a widely accepted international standard for EMS with a focus on continual improvement;
- Companies may be asked to demonstrate conformance with ISO 14001 as a condition of doing business in some markets; and
- The Standard is consistent with the key elements found in many EMS models, including the Eco-Management and Audit Scheme, EPA's Performance Track and the Code of Environmental Management Principles for Federal Agencies.

Figure 3: EMS Model



Key Elements of an EMS: A Snapshot

- **Environmental policy** — Develop a statement of your organization's commitment to the environment. Use this policy as a framework for planning and action.
- **Environmental aspects** — Identify environmental attributes of your products, activities and services. Determine those that could have significant impacts on the environment.
- **Legal and other requirements** — Identify and ensure access to relevant laws and regulations, as well as other requirements to which your organization adheres.
- **Objectives and targets** — Establish environmental goals for your organization, in line with your policy, environmental impacts, the views of interested parties and other factors.
- **Environmental management program** — Plan actions necessary to achieve your objectives and targets.
- **Structure and responsibility** — Establish roles and responsibilities for environmental management and provide appropriate resources.
- **Training, awareness and competence** — Ensure that your employees are trained and capable of carrying out their environmental responsibilities.
- **Communication** — Establish processes for internal and external communications on environmental management issues.
- **EMS documentation** — Maintain information on your EMS and related documents.
- **Document control** — Ensure effective management of procedures and other system documents.
- **Operational control** — Identify, plan and manage your operations and activities in line with your policy, objectives and targets.
- **Emergency preparedness and response** — Identify potential emergencies and develop procedures for preventing and responding to them.
- **Monitoring and measurement** — Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements.
- **Nonconformance and corrective and preventive action —** Identify and correct problems and prevent their recurrence.
- **Records** — Maintain and manage records of EMS performance.
- **EMS audit** — Periodically verify that your EMS is operating as intended.
- **Management review** — Periodically review your EMS with an eye to continual improvement.



Environmental Policy

Communicating your environmental vision

Key Policy Commitments:

- ☑ Continual improvement
- ☑ Pollution prevention
- ☑ Compliance with relevant laws and regulations

An environmental policy is top management's declaration of its commitment to the environment. This policy should serve as the **foundation** for your EMS and provide a **unifying vision** of environmental concern by the entire organization. Given its importance, your policy should be more than just flowery prose.

Since it serves as the framework for setting environmental objectives and targets, the policy should be **brought to life** in your plans and deeds. Everyone in the organization should **understand** the policy and what is expected of them in order to achieve the organization's objectives and targets.

Your policy should contain three key commitments *(see box),* including a commitment to **continual improvement**. While this does **not** mean that you must improve in all areas at once, the policy should drive your organization's efforts to continually improve environmental management (and the performance that results from these efforts).

Sample environmental policies are provided in the ***Tool Kit*** *(see Appendix A).*

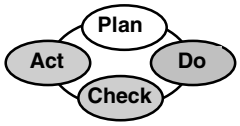
Hints:

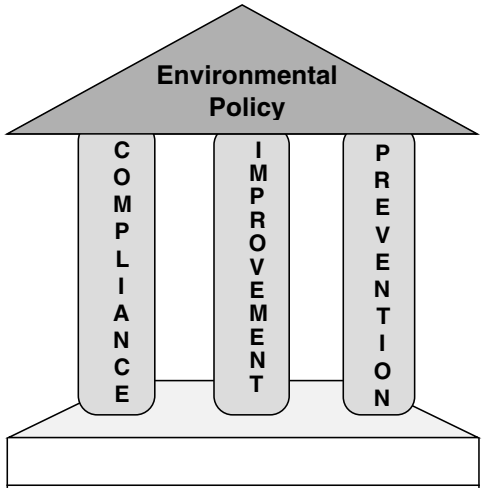
- Your organization probably has some type of environmental policy now, **even if it's not written down**. For example, your organization probably is committed to complying with the law and avoiding major environmental problems, at a minimum. Document existing commitments as a starting point.
- Your policy should relate to your products and services, as well as supporting activities. Consider the results of your **preliminary review** (see Section 3) and your analysis of the **environmental aspects** of your products, services and activities before finalizing the policy. These two activities can provide insight as to how your organization interacts with the environment and how well it is meeting its challenges. For example, information obtained during the preliminary review might help you define specific policy commitments.
- Keep your policy **simple and understandable**. Ask yourself: What are we trying to achieve? How can we best communicate this to the rest of the organization? Could our employees describe the intent of our policy in ten words or less?

Continual Improvement:

"Process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy."

- ISO 14001





Three Pillars of an Environmental Policy

- The environmental policy should be **explicit enough to be audited**. If you choose to use phrases such as "We are committed to excellence and leadership in protecting the environment", consider how you would demonstrate that such a commitment is being met.

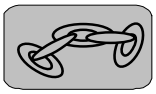
- The environmental policy can be a stand-alone document or it can be **integrated** with your health & safety, quality, or other organizational policies.

- Consider who should be involved in **developing the policy** and the best process for writing it. Input from a range of people within your organization should increase commitment and ownership.

- Make sure that your employees **understand** the policy. Options for communicating your policy internally include posting it around the work sites (e.g., in lunchrooms), paycheck stuffers, incorporating the policy into training classes and materials, and referring to the policy at staff or all-hands meetings. **Test awareness** and understanding from time to time by asking employees what the policy means to them and how it affects their work.

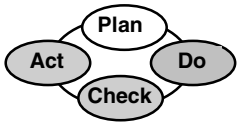
- The policy also should be communicated **externally**. Some options for external communications include placing the policy on business cards, in newspaper advertisements and in annual reports, among other options. You might choose to communicate the policy proactively or in response to external requests (or both). This decision should be factored into your overall strategy for external communication (see later discussion under "Communications").

- Consider how you would **demonstrate** that you are living by the commitments laid out in the policy. This is a good test of whether or not the policy is a "living document".



- *Environmental Aspects*
- *Objectives & Targets*
- *Training & Awareness*
- *Communication*
- *Management Review*

*For EPA's Performance Track program, an organization's **policy** must include a commitment to share information on environmental performance and the EMS with the community. Participating organizations also must show **continued improvement** in specific environmental categories, such as energy use, water discharges or waste generation, among others.*



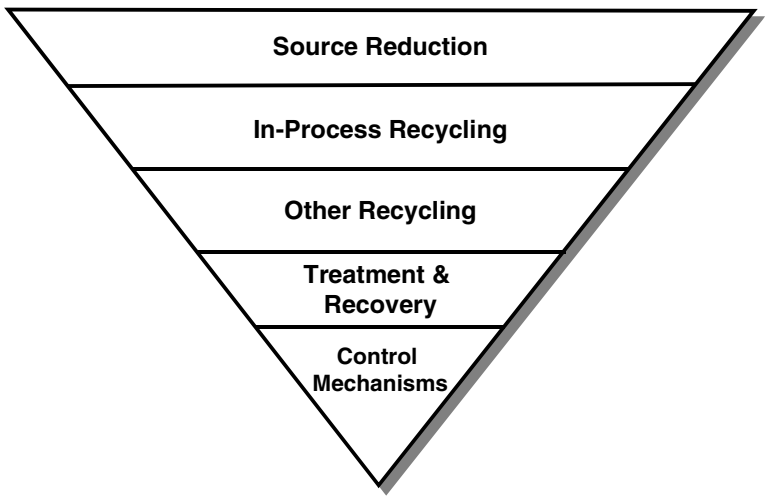
Commitments to Compliance with Legal Requirements and Pollution Prevention

Compliance with legal requirements is a critical consideration in EMS development and implementation. EMS implementation requires an organization, among other things, to:

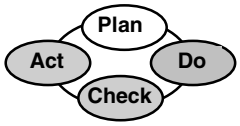
- develop and communicate an environmental **policy** that includes a commitment to compliance*;*
- develop and implement a procedure to identify, analyze and have **access to environmental laws and regulations**;
- set **objectives and targets** in line with its environmental policy, which includes a commitment to compliance;
- establish **management programs** to achieve its objectives;
- **train employees** and **communicate** relevant EMS requirements to them;
- establish and implement **operational control** procedures;
- establish and implement a procedure for **periodically evaluating compliance**; and
- establish and implement a procedure to carry out **corrective and preventive actions**.

While the requirements noted above relate directly to an organization's management of legal requirements, each of the seventeen EMS elements described in this Guide can contribute to enhanced compliance (including communication, documentation and document control, records management, EMS audits, and management review). An EMS that includes the elements described in this Guide will help your organization improve or maintain its compliance performance and facilitate the establishment of objectives and targets that go "beyond compliance."

Prevention of Pollution Hierarchy

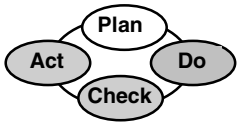


EMS design and implementation also should take into account the **Pollution Prevention** (P2) **hierarchy**. In evaluating P2 opportunities, organizations should start at the top of the pyramid (i.e., source reduction) and work their way down as needed to define the most appropriate methods for preventing pollution. Examples and best practices of P2 in operation are provided throughout this Guide



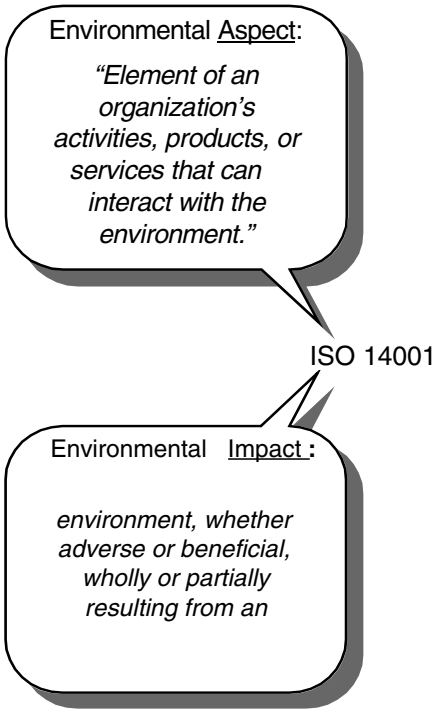
Capture the Learning: Environmental Policy Worksheet

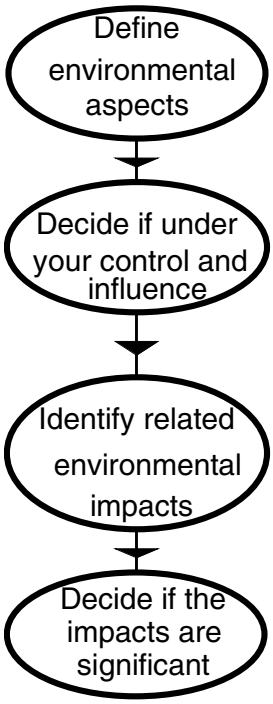
Do we have an **existing policy?** If yes, how was the policy **developed**? When was the policy last **reviewed**?	
Does the policy reflect the **three key commitments** (commitments to compliance, prevention of pollution and continual improvement?) What **other commitments** does or should our policy contain?	
How does our policy take into account the environmental attributes of our **products, activities and services**?	
How is the policy **communicated** to our employees? Do our employees **understand** the critical aspects of our policy? How do we know?	
What **feedback** have we received on the policy (from employees, contractors or other interested parties)? What happens when we receive feedback on the policy?	
How do we make our policy **available to external parties**? Is this process effective?	
Our next step on environmental policy is to …	



Identifying Environmental Aspects

How your organization interfaces with the environment





To plan for and control its environmental impacts, an organization must know what these impacts are. But knowing **what** the impacts are is only part of the challenge — you also should know **where these impacts come from**. Stated another way, *how does your organization (i.e., your products, services and activities) interact with the environment?*

If your organization has undertaken pollution prevention projects, you are probably familiar with this concept — you must know **how and where** a waste is generated in order to minimize or eliminate it. And like pollution prevention, the identification and management of environmental aspects can (1) have positive impacts on the bottom line and (2) provide significant environmental improvements.

Your EMS should include a procedure to identify and assess environmental **aspects** that your organization:

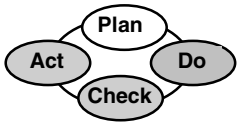
- can **control,** and
- over which it can **have an influence**.

Your organization **is not expected** to manage issues outside its sphere of influence or control. For example, while your organization probably has control over how much electricity it buys from a supplier, it likely does **not** control the way in which that electricity is generated. However, there are benefits to "casting a wide net" – that is, looking at your aspects in a comprehensive way.

The relationship between aspects and impacts is often one of **cause and effect**. The term "aspects" *(see definition above)* is neutral, so keep in mind that your environmental aspects could be either **positive** (such as making a product out of recycled materials) or **negative** (such as discharging toxic materials to a stream). Aspects may result from **past activities**, such as spills.

Once you have identified the environmental aspects of your products, activities, and services, you should determine which aspects could have significant i**mpacts** on the environment. Aspects that have one or more significant impact should be considered **significant environmental aspects**. These significant aspects should be considered when you establish environmental **objectives**, define **operational controls** and consider other actions, as discussed later.

A multi-step process *(see figure at left)* can be used to make this evaluation. Keep the resulting information **up-to-date**, so that potential aspects of new products, services, and activities are factored into your objectives and controls.



Hints:

- In identifying aspects and impacts, you should look **beyond activities covered by laws and regulations**. But because many of your aspects/impacts may be addressed by legal requirements, your compliance program might yield some valuable information. Permits, audit reports, and monitoring records can be useful inputs. Beyond regulated aspects, consider land, energy, and natural resource use, for example.

- Once you have identified environmental aspects and related significant impacts, use this information in setting your objectives and targets. **This does not mean that you need to address all of your impacts at once**. There may be good reasons (such as cost, availability of technology, and scientific uncertainty) for addressing some impacts now while deferring action on others. Keep in mind that managing environmental aspects can have **positive business impacts**.

- Remember to look at **services** as well as products. While the need to examine on-site operations might be obvious, you also should consider the potential impacts of what you do "**off-site"** (such as servicing equipment at customer sites). Similarly, the environmental aspects of the products, vendors, and contractors **you use** may be less obvious, but should still be considered.

- Identifying significant environmental aspects is one of the most critical steps in EMS implementation. It can be one of the most **challenging** – as well as one of the most **rewarding**. Decisions you make in this task can affect many other system elements (such as, setting objectives and targets, establishing operational controls and defining monitoring needs). Careful planning and conduct of this activity will pay dividends in later steps.

Service Organizations Benefit from an EMS

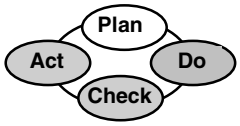
The **US Postal Service** examined environmental aspects related to the vehicles it operates, the chemicals it uses to maintain equipment, the solid wastes it generates, and the products (stamps) that it sells.

"Products" are the tangible results of a process that transforms inputs into outputs. "Services" also results from a process, but are intangible (i.e., you cannot "hold" them). "Activities" may be directly or indirectly related to the provision of products or services to customers.

Milan Screw Products set up an internal task group to identify environmental aspects. As part of this process, external stakeholders were identified and interviewed to understand their environmental concerns. These stakeholder concerns were added to the list of environmental aspects.

Getting Started

- To understand your environmental aspects, it helps to understand the processes by which you generate products and services. **Flow charting** your major processes can help you understand the process inputs and outputs as well as how materials are used. A sample flow chart is provided in the **Tool Kit** (see Appendix A). You might also want to consider the **views of interested parties** (e.g., neighbors, civic groups, regulators, etc.) in this process. Some organizations have found external parties to be a good resource in identifying environmental aspects.



Factors to Consider:
- ecological effects
- human health impacts
- catastrophic effects
- resource depletion
- scale, severity & duration of impacts
- probability of occurrence
- cost of changing
- other business effects

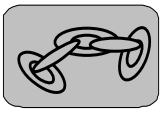
- There are sources of information to help you identify and assess your environmental aspects. For starters, look at your permits, regulations that apply to your operations, EPCRA reports, Material Safety Data Sheets and monitoring records. Trade associations, regulatory agencies, customers and suppliers might provide useful information to support your assessment

- Your team should define the **criteria** that will be used to determine significance. Such criteria often include the types of impact; the magnitude, frequency and duration of the impact; regulatory status, and other factors. Consider the **questions on the following page** for identifying aspects and impacts

Use visual tools. As a starting point, some organizations prepare maps of their site and building(s), along with surrounding land uses. The implementation team uses these maps to "audit" the site to identify potential environmental aspects.

- Various techniques exist for evaluating environmental impacts. Choose one that can be readily adapted for your use in identifying environmental aspects and significant impacts. Also consider techniques used for compliance with the OSHA Process Safety Management Standard, environmental impact assessments, and life cycle analysis. More information on these techniques can be found in the **Tool Kit** (see Appendix A).

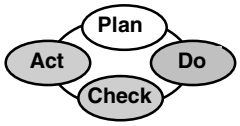
- Once you've found a process that works for your organization, describe the process in a written **procedure**. A sample procedure for performing the assessment is provided in the **Tool Kit**.



- *Objectives & Targets*
- *Training & Awareness*
- *Communications*
- *Operational Controls*
- *Monitoring & Measurement*

- You can **start out with a simple process** for identifying aspects and impact, then refine the process in the future as needed. You also can identify and consider more obvious environmental impacts or "low hanging fruit" first, then tackle more complex issues later. As with any element of the EMS, there is virtue in considering how your process for identifying aspects and impacts might be improved over time. Ask yourself: *Is there additional information we should consider in this process? Do we have the right people involved? Are we using the results in a meaningful way?*

- Use the **worksheet** at the end of this section to capture some of your ideas. Using this worksheet will give you a "jump start" on implementing this EMS element.



Identifying Aspects and Impacts: Some Questions to Consider:

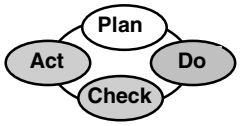
Identifying Aspects	Evaluating Impacts
❑ Which operations and activities interface with the environment in a way that could result (or has resulted) in environmental impacts? ❑ What materials, energy sources and other resources do we use in our work? ❑ Do we have emissions to the air, water or land? ❑ Do we generate wastes, scrap or off-spec materials? If so, does the treatment of disposal of these materials have potential environmental impacts? ❑ Which characteristics or attributes of our products or services could result in impact the environment (through their intended use, end-of-life management, etc.)? ❑ Does our land or infrastructure (e.g., buildings) interact with the environment? ❑ Which activities (for example, chemical storage) might lead to accidental releases?	❑ Are the impacts actual or potential? ❑ Are the impacts beneficial or damaging to the environment? ❑ What is the magnitude or degree of these impacts? ❑ What is the frequency or likelihood of these impacts? ❑ What is the duration and geographic area of these impacts? ❑ Which parts of the environment might be affected (e.g., air, water, land, flora, fauna)? ❑ Is the impact regulated in some manner? ❑ Have our interested parties expressed concerns about these impacts?

The Link Between Aspects and Impacts (Some Examples from a Real Company)

Aspects	Potential Impacts
Emissions of volatile organic compounds	Increase in ground level ozone
Discharges to stream	Degradation of aquatic habitat and drinking water supply
Spills and leaks	Soil and groundwater contamination
Electricity use	Air pollution, global warming
Use of recycled paper	Conservation of natural resources

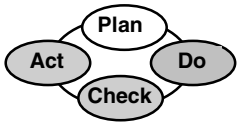
Things to Consider in Evaluating Environmental Aspects:

- Air Emissions
- Water Discharges
- Solid and Hazardous Wastes
- Land Use
- Contamination of Land
- Raw Material and Resource Use (water, energy, etc.)
- Local Issues (e.g. noise, odor, dust, traffic, etc.)
- Normal and Abnormal Conditions (start-up, shutdown, emergencies)



Capture the Learning: Environmental Aspects Worksheet

Do we have an **existing process** for identifying aspects and/or impacts? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization? Should any **outside parties** be involved?	
When is the **best time** for us to implement this process? Can this effort be **linked** to an existing business process (such as our budget, annual planning or auditing cycles?)	
What are some **obvious environmental aspects** of our: ☞ Operations and activities? ☞ Products? ☞ Services?	
What **sources of information** can we use to identify environmental **aspects**?	
What **sources of information** can be used to determine the environmental **impacts** of these aspects?	
What **significance criteria** might make sense for our organization?	
How will we keep this information **up-to-date**?	
Our next step on environmental aspects is to …	



Legal and Other Requirements

Setting the legal framework for your EMS

Legal requirements include:

- Federal requirements
- State and local requirements
- Standards in locations where you sell products/services
- Permit conditions

Other requirements might include (for example):

- Company-specific codes
- International Chamber of Commerce (ICC) Charter for Sustainable Development
- Chemical Manufacturers Association's (CMA) Responsible Care
- American Petroleum Institute's Strategies for Today's Environmental Partnership (API STEP)
- Other industry codes or programs to which your organization voluntarily subscribes.

To comply with the laws and regulations that apply to your organization, you must first know **what the rules are** and **how they affect** what you do. As discussed earlier, compliance with legal requirements is one of the "three pillars" upon which your environmental policy should be based. The potential costs of non-compliance (possible damage to the environment, revenue loss and impact on public image, for example) can be very high.

An effective EMS includes processes to:

- **identify** and **communicate** applicable legal and other requirements, and;
- **ensure** that these requirements are factored into the organization's management efforts.

New or revised legal requirements might require modification of your environmental objectives or other EMS elements. By **anticipating new requirements** and making changes to your operations, you might avoid some future compliance obligations and their costs.

Getting Started

Your EMS should include a procedure for **identifying, having access to and analyzing** applicable legal and other requirements. These "other requirements" might include industry codes of practice or similar requirements to which your organization might subscribe.

Identifying applicable regulations, interpreting them, and determining their impacts on your operations can be a time-consuming task. Fortunately, there are many methods for obtaining information about applicable laws or regulations. These methods include:

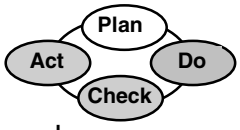
- commercial services (with updates offered on-line, on CD-ROM or in paper form);
- regulatory agencies (federal, state and local);
- trade groups / associations;
- the Internet (see USEPA web site at *www.epa.gov*);
- public libraries;
- seminars and courses;
- newsletters / magazines;
- consultants and attorneys; and
- customers, vendors and other companies.

Small business assistance programs exist in every state. Under the Clean Air Amendments of 1990, each state environmental regulatory agency has established

technical and compliance assistance programs to help

KEY STEPS

- ☑ Identify Requirements
- ☑ Analyze Impacts
- ☑ Communicate
- ☑ Act



Get information on federal environmental rules on the internet at http://www.epa.gov

companies comply with air quality rules. In some cases, these programs have expanded into other environmental "media", such as water and waste management). In addition, National Compliance Assistance Centers can provide compliance assistance for certain industry sectors (see Appendix A for more information).

Once applicable requirements have been identified and analyzed for their potential impacts, **communicate** these requirements (and plans for complying with them) to appropriate people within the organization. Communicating "other applicable requirements" (as well as their impacts on the organization) is an important but often overlooked step. Keep in mind that different people may have different information needs.

- *Environmental Policy*
- *Objectives & Targets*
- *Training & Awareness*
- *Communication*
- *Operational Controls*

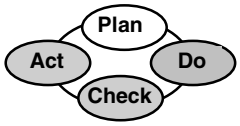
As with many EMS elements, this is **not a "one time" activity** – since legal and other requirements change over time, your process should ensure that you are working with up-to-date information.

See Appendix A for related resources and a sample procedure

Resources to identify and track environmental laws and regulations are described in the **Tool Kit** (Appendix A). The **Tool Kit** also contains a sample procedure for tracking laws and regulations.

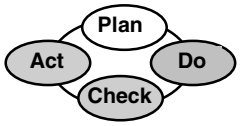
Commonly Applicable Federal Environmental Laws in the US

Clean Air Act (CAA) [40 CFR Parts 50-99]	Establishes ambient and source emission standards and permit requirements for conventional and hazardous air pollutants.
Clean Water Act (CWA) [40 CFR Parts 100-145, 220-232, 410-471]	Establishes ambient and point source effluent standards and permit requirements for water pollutants, including sources that discharge directly to a waterbody or to a public sewer system.
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [40 CFR Parts 150-189]	Establishes a program for Federal review of, registration and control of pesticides.
Resource Conservation and Recovery Act (RCRA) [40 CFR Parts 240-299]	Establishes regulations and permit requirements for hazardous waste management. Also, creates standards for underground storage tanks that hold oil or hazardous substances.
Toxic Substances Control Act (TSCA) [40 CFR Parts 700-799]	Regulates the use, development, manufacture, distribution and disposal of chemicals. Certain chemicals (such as PCB's) are subject to specific management standards.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as "Superfund") [40 CFR Parts 300-311]	Establishes a program for cleaning up contaminated waste sites and establishes liability for clean-up costs. Also, provides reporting requirements for releases of hazardous substances
Emergency Planning and Community Right-To-Know Act (EPCRA) [40 CFR Parts 350-374]	Establishes a program (also known as the "Toxic Release Inventory") to inform the public about releases of hazardous and toxic chemicals. Reporting requirements apply to companies that use, process or store specific chemicals over specified quantities.
Hazardous Materials Transportation Act (HMTA) [49 CFR Parts 100-180]	Establishes standards for the safe transportation of hazardous materials.



Capture the Learning: Legal & Other Requirements Worksheet

Do we have an **existing process** for identifying applicable legal and other requirements? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization? What should their specific responsibilities be?	
What **sources of information** do we use to identify applicable legal and other requirements? Are these sources adequate and effective? How **often do we review** these sources for possible changes?	
How do we ensure that we have **access** to legal and other requirements? (List any methods used, such as on-site library, use of web sites, commercial services, etc.)	
How do we **communicate information** on legal and other requirements to people within the organization who need such information?	
Who is **responsible** for analyzing new or modified legal requirements to determine how we might be affected?	
How will we keep information on legal and other requirements **up-to-date**?	
Our next step on legal and other requirements is to …	



Objectives and Targets

Establishing the goals for environmental management

Objectives and targets help an organization **translate purpose into action.** These environmental goals should be factored into your strategic plans. This can facilitate the integration of environmental management with your organization's other management processes.

You determine what objectives and targets are appropriate for your organization. These goals can be applied organization-wide or to individual units, departments or functions -- depending on where the implementing actions will be needed.

In setting objectives, keep in mind your environmental **policy,** including its three "pillars." You should also consider your significant environmental **aspects**, applicable **legal and other requirements**, the **views of interested parties**, your **technological options**, and **financial, operational,** and **other organizational considerations**.

Environmental Objective:

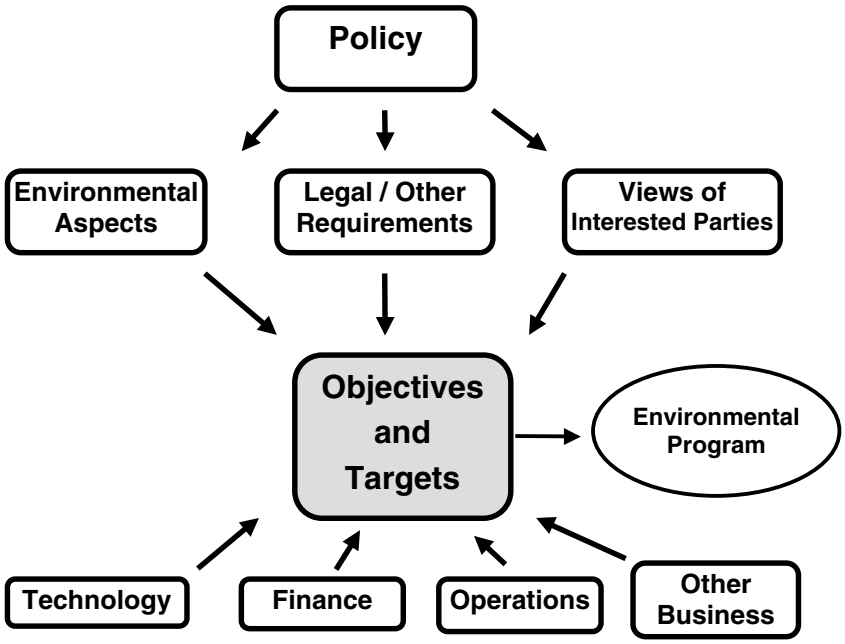
"Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable."

ISO 14001

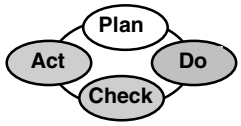
Environmental Target:

"Detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those obiectives?

Figure 4



There are no "standard" environmental objectives that make sense for all organizations. Your objectives and targets should reflect what your organization does, how well it is performing and what it wants to achieve.



Hints:

- Setting objectives and targets should involve the **people in the relevant functional area(s)**. These people will be well positioned to establish, plan for, and achieve these goals. **Involving people** helps to **build commitment.**

- Get **top management buy-in** for your objectives. This should help to ensure that adequate resources are applied and that the objectives are integrated with other organizational goals.

- In **communicating objectives to employees,** try to link objectives to the **actual environmental improvements** being sought. This gives people something tangible to work towards.

- Objectives should be **consistent** with your overall mission and plan and the key commitments established in your **policy** (pollution prevention, continual improvement, and compliance). Targets should be sufficiently clear to answer the question: "Did we achieve our objectives?"

- Be **flexible** in your objectives. Define a desired result, then let the people responsible determine **how** to achieve the result.

- Objectives can be established to **maintain** current levels of performance as well as to **improve** performance. For some aspects you might have both maintenance and improvement objectives.

- Communicate your **progress** in achieving objectives and targets across the organization. Consider a regular report on this progress at staff meetings.

- To obtain the **views of interested parties**, consider holding an open house or establishing a focus group with people in the community. These activities can have other payoffs as well.

- How many objectives and targets should an organization have? Various EMS implementation projects for small and medium-sized organizations indicate that it is best to start with a limited number of objectives (say, three to five) and then expand the list over time. **Keep your objectives simple** initially, gain some early successes, and then build on them.

- Make sure your objectives and targets are **realistic.** Determine how you will **measure progress** towards achieving them.

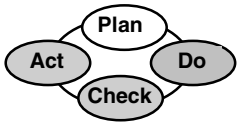
- Keep in mind that your **suppliers (service or materials)** can help you in meeting your objectives and targets (e.g., by providing more "environmentally friendly" products).

Factors to consider in setting objectives and targets

- ☑ *ability to control*
- ☑ *ability to track / measure*
- ☑ *cost to track / measure*
- ☑ *progress reporting*
- ☑ *links to policy commitments*

- *Environmental Policy*
- *Environmental Aspects*
- *Legal & Other Requirements*
- *Structure & Responsibility*
- *Operational Control*
- *Monitoring & Measurement*
- *Management Review*

A sample process tool and procedure for setting objectives and targets are included in the Tool Kit (Appendix A).



Comparing Objectives and Targets - Some Examples

Objectives	Targets
Reduce energy usage	• Reduce electricity use by 10% in 2001 • Reduce natural gas use by 15% in 2001
Reduce usage of hazardous chemicals	• Eliminate use of CFCs by 2002 • Reduce use of high-VOC paints by 25%
Reduce hazardous waste generation	• Reduce chrome wastes in plating area by 50% in 2001
Improve employee awareness of environmental issues	• Hold monthly awareness training courses • Train 100% of employees by end of year
Improve compliance with wastewater discharge permit limits	• Zero permit limit violations by the end of 2001

☆☆ *POLLUTION PREVENTION* ☆☆

Pfizer Global Research & Development (formerly Warner-Lambert Parke-Davis) has a pollution prevention program that shows that improving the environment and the bottom line can go hand-in-hand. For example:

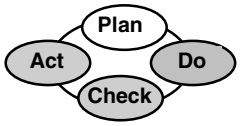
- By replacing chillers and redesigning chilling systems to be more efficient, the company has realized $250,000 in energy savings. Because the company is more energy efficient, it has reduced emissions from the local power supplier.
- By redesigning and modifying its dust collection system, the company has replaced its 100-hp motors with 40 hp motors, without compromising the effectiveness of the dust collection system. This has lowered the company's operating costs and reduced emissions at the local power plant.

☆☆ *POLLUTION PREVENTION* ☆☆

Some Motorola manufacturing sites have reduced their water consumption and wastewater discharges by greater than 95% by installing ion exchange technology and employing better operating techniques. These changes have lowered usage of water treatment chemicals and have resulted in considerable cost savings.

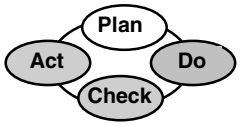
For EPA's Performance Track program, organizations must consider the following factors in setting objectives and targets:

- **Prevention of noncompliance,**
- **Prevention of pollution at the source**
- **Minimization of cross-media pollutant transfers, and**
- **Environmental performance improvement**



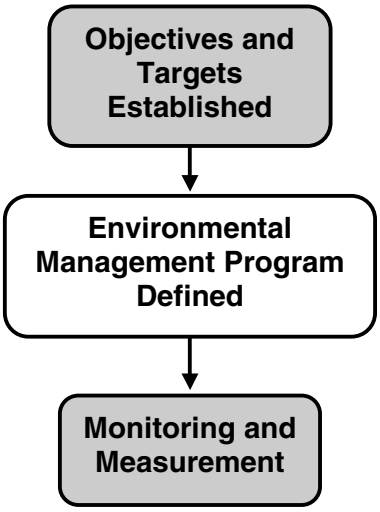
Capture the Learning: Objectives and Targets Worksheet

Do we have an **existing process** for setting and reviewing environmental objectives and targets? If so, does that process need to be revised? In what way(s)?	
Who needs to be involved in this process within our organization? Should any outside parties be involved?	
When is the **best time** for us to implement this process? Can it be **linked** to another existing business process (like our annual or strategic planning process?)	
What are our **existing environmental goals**? How were these developed? Who was involved? What **factors** were considered in setting these goals?	
How do we **obtain the views of interested parties**? **How effective** has our process been?	
How can we effectively and efficiently **track our progress** and **communicate the results**? **Who** is in the best position to do this?	
Our next step on environmental objectives and targets is to …	



Environmental Management Program(s)

A road map for achieving your environmental goals



So far, this Guide has focused on the **foundations** of an EMS -- the planning elements. An important part of this planning effort is defining what your organization intends to achieve in the environmental area. To meet these objectives and targets, you need an **action plan --** also known as an environmental management program.

Your environmental management program should be **linked directly to your objectives and targets** — that is, the program should describe **how** the organization will **translate its goals and policy commitments into concrete actions** so that environmental objectives and targets are achieved.

To ensure its effectiveness, your environmental management program should define:

- the **responsibilities** for achieving goals *(who will do it?)*
- the **means** for achieving goals *(how will they do it?)*
- the **time frame** for achieving those goals *(when?)*

Keep in mind that your program should be a **dynamic** one. Consider modifying the program when:

- objectives and targets are modified or added;
- relevant legal requirements are introduced or changed;
- substantial progress in achieving your objectives and targets has been made (or has not been made); or
- your products, services, processes, or facilities change or other issues arise.

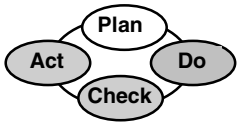
At St. Joseph's Mercy Hospital, mercury was in widespread use. The Hospital maintained a contract with a professional environmental response company to clean up and dispose of any discarded equipment and waste that resulted from mercury spills. Each spill clean-up cost the Hospital at least $1,000. Mercury was identified as an environmental aspect during EMS implementation, leading to the development of a Mercury Reduction Initiative. This Initiative is expected to save the Hospital as much as $20,000 per year.

Your action plan need **not** be compiled into a single document. A "**road map**" to several action plans is an acceptable alternative, as long as the key responsibilities, tactical steps, resource needs and schedules are defined adequately in these other documents.

This program should **not** be developed in a vacuum — it should be **coordinated or integrated with other organizational plans, strategies, and budgets**. For example, if you are planning for a major expansion in one of your service operations, then it makes sense to look at the possible environmental issues associated with this operational expansion at the same time.

Hints:

- **Build** on the plans and programs you have now for environmental compliance, health & safety, and/or quality management purposes.
- **Involve your employees** early in establishing and carrying out the program.



"Before, we focused on compliance issues without the benefit of an EMS. Now, we have a strategic plan in place to look beyond legal requirements and save money. It makes my job easier when I can prove my department does not have to be a cost center."

Charlie Saunders, EMS Manager,
Pfizer Global Research &
Development

- Clearly **communicate** the expectations and responsibilities laid out in the program to those who need to know.
- In some cases, your environmental management program may encompass a number of existing **operating procedures or work instructions** for particular operations or activities. In other cases, new operating procedures or work instructions might be required to implement the program.
- Re-evaluate your action plan when you are considering changes to your products, processes, facilities or materials. Make this re-evaluation part of your **change management process**.
- **Keep it simple** (see sample tool, below) and **focus on continual improvement** of the program over time.
- There may be real **opportunities** here! Coordinating your environmental program with your overall business plans and strategies may position your organization to exploit some significant cost-saving opportunities

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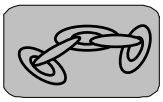


- ***Objectives & Targets***
- ***Structure & Responsibility***
- ***Communication***
- ***Operational Control***
- ***Monitoring & Measurement***

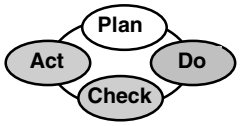
Figure 5. Environmental Management Program (Sample Tool)

Objective / Target #1: _____					
Action Items	Priority	Responsibilities	Schedule	Resources Needed	Comments

*A full-size copy of this tool is provided in the **Tool Kit** (see Appendix A).*

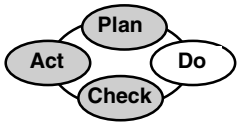
☆☆ ***POLLUTION PREVENTION*** ☆☆

In an effort to reduce VOC emissions, **Aeroquip Corporation** successfully replaced a high-solids paint with a water-based paint. Solvent use decreased significantly because the dilution solvent for the paint is now deionized water.



Capture the Learning: Environmental Management Programs Worksheet

Do we have an **existing process** for establishing environmental management programs? If yes, does that process need to be revised? In what way?	
What environmental management programs do we have **in place now**?	
What is the **basis** for our environmental management programs (for example, do they consider our environmental objectives, our environmental policy commitments and other organizational priorities)?	
Who needs to be involved in the design and implementation of these programs within our organization?	
When is the **best time** for us to establish and review such programs? Can this effort be **linked** to an existing business process (such as our budget, planning or auditing cycles?)	
How do we ensure that **changes to products, processes, equipment and infrastructure** are considered in our programs?	
How will we otherwise keep our programs **up-to-date**?	
Our next step on environmental management programs is to …	



Structure and Responsibility

Aligning your resources to succeed

"Resources include human resources and specialized skills, technology, and financial resources."

- ISO 14001

Characteristics of a good management representative:

For an EMS to be effective, roles and responsibilities must be clearly defined and communicated. The commitment of all employees is needed for an EMS to live up to its full potential.

Top management plays a key role by **providing resources** to ensure that the EMS is implemented effectively. This is one of the most important jobs of top management (see "Finding Resources" on next page). In some organizations, "top management" might be a single individual, while in others it might be a group of people (such as a board of directors).

Any effective management system needs an advocate. Thus, top management should **appoint a management representative**. This representative (1) ensures that the EMS is established and implemented; (2) reports on its performance over time; and (3) works with others to modify the EMS as needed. The management representative can be the same person who serves as the project champion (as discussed in Section 3), but this is not mandatory. (A business owner, plant or shop manager, or any number of other people might serve as an effective EMS management representative.)

More organizational advantages of small business:

- ☑ shorter lines of communication
- ☑ less complex organization
- ☑ limited delegation
- ☑ simpler access to management

Small and medium-sized organizations may have **advantages** over larger ones in structuring their resources for environmental management. Because personnel and other resources are generally more limited in smaller organizations, people often "wear more than one hat" and have experience in performing multiple functions. An individual responsible for environmental management in a smaller organization also might be responsible for quality, health & safety, facilities, or other functions. In such cases, integrating environmental responsibilities with other functions can be greatly simplified.

Getting Started:

The following questions can help you determine the right organizational structure for environmental management:

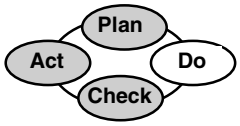
- ***Look at the scope of your environmental management program***: What capabilities do we need? Who will help to make the EMS effective? What training or other resources do we need?

- ***Look at your significant environmental aspects and compliance needs***: What operations / activities need to be controlled? Who needs to be involved to ensure that controls are implemented?

Getting Started

Look at:

- ☑ Program Scope
- ☑ Environmental Aspects
- ☑ Objectives
- ☑ Previous audits
- ☑ Other systems



Consider integrating EMS with your existing:

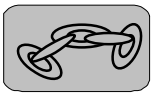
- ☑ information systems
- ☑ purchasing controls
- ☑ quality procedures
- ☑ work instructions
- ☑ training programs
- ☑ communication efforts
- ☑ reporting systems
- ☑ recruitment, appraisal and disciplinary processes

Look at the results of previous audits or other assessments: What does this information tell us about the effectiveness of our organizational structure and how it might be improved?

- ***Look at the current responsibilities for environmental management***: How can we enhance ownership of environmental management across the organization? How can other functions support the EMS? (See next page.)

- ***Look at your objectives and targets, including those related to compliance and pollution prevention***. How will the organizational structure help up achieve these goals?

- ***Look at your quality management and / or other existing management systems***: What roles and responsibilities exist in these management systems? Do opportunities for system integration exist?



- *Objectives & Targets*
- *Communication*
- *Training & Awareness*
- *Management Review*

Consider **flow charting** your existing environmental management activities. This can help you understand how these processes work and the final product can be a great communication and training tool. Flow charts also can be useful to look at processes such as chemical purchasing and distribution, employee training, and preventive maintenance, among others. **Appendix C** provides information on process mapping.

*See **Appendix C** for information on process mapping*

Hints:

- Build **flexibility** into your organizational structure. Recognize that environmental (and other) management needs will change over time.

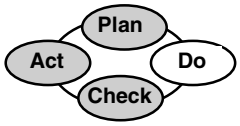
- **Communicate** to people what their roles are (as well as the roles of others). One tool for communicating these responsibilities is a **responsibility matrix.** (See the **Tool Kit** in Appendix A for an example of such a matrix.)

Appendix A provides a sample responsibility matrix

Finding Resources

In most cases, developing and maintaining an EMS will not require large capital outlays. What an EMS will require is **time**. Many smaller organizations find they can make effective use of interns or temporary employees to perform potentially time-consuming EMS development tasks (such as collecting data, drafting procedures, etc.). This allows in-house personnel to focus on more complex EMS development tasks. Also, look for areas where environmental management can support other organizational functions (and vice-versa — see next page).

More information on resources is found in Appendix E of this Guide

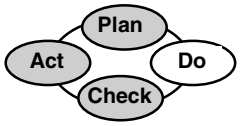


How Various Functions Can Support Your EMS

Functions	How They Can Help (Possible Roles)
Purchasing	• Develop and implement controls for chemical / other material purchases
Human Resources	• Define competency requirements and job descriptions for various EMS roles • Train temporary workers and contractors; maintain training records • Integrate environmental management into reward, discipline and appraisal systems
Maintenance	• Implement preventive maintenance program for key equipment • Support identification of environmental aspects
Finance	• Track data on environmental-related costs (such as resource, material and energy costs, waste disposal costs, etc.) • Prepare budgets for environmental management program • Evaluate economic feasibility of environmental projects
Engineering	• Consider environmental impacts of new or modified products and processes • Identify pollution prevention opportunities
Top Management	• Communicate importance of EMS throughout organization • Provide necessary resources • Track and review EMS performance
Quality	• Support document control, records management and employee training efforts • Support integration of environmental and quality management systems
Line Workers	• Provide first-hand knowledge of environmental aspects of their operations • Support training for new employees

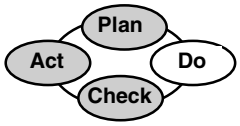
For EPA's Performance Track program, organizations must provide appropriate incentives for personnel to meet EMS requirements.

See the EPA/NSF project report*, Implementing an EMS in Community-Based Organizations* for more ideas on how organizations with limited resources can implement an EMS. Download the report free of charge at www.nsf-isr.org or www.epa.gov.



Capture the Learning: Structure & Responsibility Worksheet

How do we **define roles, responsibilities and authorities** for environmental management now? Is this process **effective?**	
Who is / will be our EMS **Management Representative**? Does this individual have the necessary authority to carry out the responsibilities of this job?	
Are our key roles and responsibilities for environmental management **documented** in some manner? If so, how (e.g., job descriptions, organizational charts, responsibility matrix, etc.)	
How are EMS roles and responsibilities **communicated** within the organization?	
How do we ensure that **adequate resources** have been allocated for environmental management? How is this process **integrated** with our overall budgeting process? How are environmental expenditures **tracked**?	
How will we keep this information **up-to-date**?	
Our next step on structure and responsibility is to …	



Training, Awareness and Competency

Building internal capabilities

Implementing and maintaining an EMS involves <u>everyone</u>

There are two excellent reasons for training employees about environmental management and your EMS:

- Every employee can have potential **impacts** on the environment.
- Any employee can have **good ideas** about how to improve environmental management efforts.

Each person and function within your organization can play a role in environmental management. For this reason, your training program should cast a wide net. Every employee and manager should be aware of the environmental policy, the significant environmental impacts of their work activities, key EMS roles and responsibilities, procedures that apply to their work and the importance of conformance with EMS requirements. Employees also should understand the **potential consequences** of <u>not</u> following EMS requirements (such as fines or other penalties).

Reasons for <u>Training</u>:

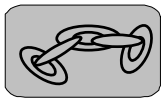
- ☑ motivation
- ☑ awareness
- ☑ commitment
- ☑ skills / capability
- ☑ compliance
- ☑ performance

All personnel should receive <u>appropriate</u> training. Such training should be **tailored** to the different needs of various levels or functions in the organization. However, training is just one element of establishing **competence,** which is typically based on a combination of education, training, and experience. For certain key roles (including tasks that can cause significant environmental impacts), you should establish criteria for measuring the competence of individuals performing those tasks.

An example of a training log is provided in the Tool Kit (see Appendix A)

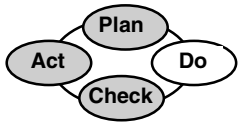
Getting Started:

- A critical first step in developing your training program is **assessing your training and skill needs**. In assessing these needs, you should consider both **general** and **specific** needs (e.g., "What EMS procedures affect Joe's daily work and what happens if they aren't followed?" "What environmental impacts might Joe's work cause?" "What broader understanding of environmental issues and our EMS does Joe need?")



- *Environmental Aspects*
- *Legal/Other Requirements*
- *Structure & Responsibility*
- *Operational Control*
- *Records*

- Look at the **training you conduct already**, for compliance with environmental and health and safety regulations and other purposes. You may find that your existing training efforts go a long way towards satisfying the requirements for the EMS. Competence might be established on the basis of regulatory-required training, in some instances.



Milan Screw Products found that it could provide a great deal of its training during "brown bag" lunches, during which employees bring their lunches, participate in a training session, and remain "on the clock" for the lunch period.

Key Steps in Developing a Training Program

Step 1:	Assess training needs & requirements
Step 2:	Define training objectives
Step 3:	Select suitable methods and materials
Step 4:	Prepare training plan (who, what, when, where, how)
Step 5:	Conduct training
Step 6:	Track training (and maintain records)
Step 7:	Evaluate training effectiveness
Step 8:	Improve training program (as needed)

Hints:

- Because of the level of effort involved in a training program, this is one EMS element where you don't want to start from scratch. Many employees may be qualified on the basis of their experience and previous training. (Keep in mind that all training should be documented.) Since some employees might require training on how to operate equipment safely, **on-the-job training** certainly can play an important role. **Computer-based training** is an option, especially for employees that spend much of their time in the field.

- **Plan and schedule** training opportunities carefully. While finding enough time for training can be a challenge, you might find creative ways to make "more time" (see "tip", above left). Use safety meetings, staff meetings, and tool box meetings to provide training and reinforce key messages.

- New employees can pose a significant training challenge. Consider developing an EMS training package for **new employee orientation**. Even better, videotape one of your current EMS training courses to show new employees.

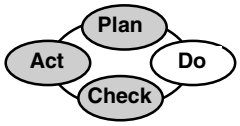
- In reviewing training needs, don't forget to consider the qualifications and training needs of your **environmental manager** and your **trainers**. Professional certification programs may be appropriate for certain functions.

- If the organization uses **temporary or contract workers**, assess their training needs as well.

- Factor EMS skills requirements into your **recruiting**, **selection**, and new employee **orientation**.

Training Resources:

- ☑ internal trainers / experts
- ☑ consultants
- ☑ community colleges
- ☑ vendors / suppliers
- ☑ customers
- ☑ technical / trade / business associations
- ☑ self-study or study groups
- ☑ training consortia (teaming with other local companies)
- ☑ computer-based training



When Training Might Be Needed:

- ☑ New employee is hired
- ☑ Employee is transferred to a new job
- ☑ Individual doesn't follow procedure / instruction
- ☑ Procedures are changed
- ☑ New process, material or equipment is introduces
- ☑ Company changes objectives and/or targets
- ☑ New regulation affects organization's activities
- ☑ Job performance must be improved

- Establishing **competency** for various tasks can be a challenge. Competency criteria for jobs that can cause significant environmental impacts should be as objective as possible.

  One informal method for assessing competency is to question employees in critical functions as to how they perform various aspects of their jobs (e.g., "Show me how you..."). Use responses to determine whether they have the requisite skills and understanding to perform the job safely. This can help you gauge whether additional training might be needed.

- Consider visual **"job aids"** to supplement training or help establish competence. Examples of job aids include written or pictorial job procedures, decision tables or flow charts.

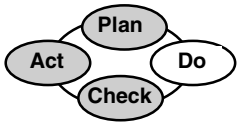
- Finally, some organizations have been successful in **blending environmental awareness training into existing safety training** programs. This can be particularly effective where safety training is mandated (i.e., by regulation or other organizational requirements) and has strong management support.

A Few Thoughts About Adult Learning

- Adults need the opportunity to integrate new ideas with what they already know.
- Information that conflicts sharply with existing beliefs or has little conceptual overlap with what is already known is acquired more slowly.
- Adults prefer self-directed learning and want to have a hand in shaping the training program.
- Adults have expectations. It is important to clarify these up-front.
- Adults prefer active participation to straight lecture.

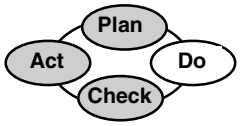
- Adapted from "Adults Learning: What Do We Know For Sure" (Training Magazine, June 1995)

For EPA's Performance Track, organizations must provide specific training for employees whose responsibilities relate directly to achieving objectives and targets and legal compliance.



Capture the Learning: Training, Awareness & Competence Worksheet

Do we have an **existing process** for environmental training? If so, does that procedure need to be revised? In what way(s)?	
What types of training do we provide now (e.g., new employee orientation, contractor training, safety training)? How would EMS-related training fit with our existing training program?	
Who is responsible for training now? Who else might need to be involved within our organization?	
How do we determine **training needs** now? (List methods used) Are these processes effective?	
Who is **responsible** for ensuring that employees receive appropriate training? How do we **track training** to ensure we are on target?	
How do we **evaluate training effectiveness?** (List methods used, such as course evaluation, post-training testing, behavior observation)	
How do we **establish competency**, where needed? (List methods used, such as professional certifications) What are the **key job functions and activities** where we need to ensure environmental competency?	
Our next step on training, awareness & competence is to …	



Communications

Maintaining the information lines

Consider communication strategies for:

- ☑ neighbors
- ☑ community groups
- ☑ other interest groups
- ☑ local officials
- ☑ regulatory agencies
- ☑ emergency responders

The importance of employee involvement in developing and implementing your EMS has been discussed earlier. In addition, there may be parties with an interest in your environmental performance and management efforts outside the organization. Effective environmental management requires effective communications, both internally and externally.

Communications will help you:

- motivate your workforce;
- gain acceptance for your plans and efforts;
- explain your environmental policy and EMS and how they relates to the overall organizational vision;
- ensure understanding of roles and expectations;
- demonstrate management commitment;
- monitor and evaluate performance; and,
- identify potential system improvements.

Effective **internal** communication requires mechanisms for information to flow top-down, bottom-up and across functional lines. Since employees are on the "front lines," they can be an excellent source of information, issues, concerns and ideas.

Pfizer Global Research & Development (formerly Warner-Lambert Parke-Davis) *has hosted local community leaders, state agencies, and federal agencies, to share its environmental activities and programs and to obtain feedback.*

Communicating with **external parties** is also important for effective environmental management. Obtaining the views of neighbors, community groups, regulators and customers, (among others), will help you understand how your organization is perceived by others. Information from external sources can be critical in setting environmental and other organizational goals.

An effective EMS should include procedures for:

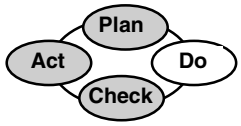
- communicating internally (between levels and functions), and
- soliciting, receiving, documenting and responding to external communications.

Getting Started:

The first step in designing a communications program is determining **your key audiences**. Make a list of internal and external audiences.

Milan Screw Products' *staff interviewed neighbors, customers, suppliers, and employees' family members to obtain the views of external parties.*

Once you identify the audiences, determine **what** you need to communicate with them. (What do they need to know about your products, operations or management efforts? What are their concerns?)



Sample procedures for internal and external communications are provided in the Tool Kit (see Appendix A)

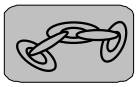
Next, decide **how** you can best reach them. Appropriate communication methods might vary from audience to audience. Start by looking at your **existing methods** for communicating, both internally and externally. These might include:

Internal Methods	**External Methods**
• newsletters	• open houses
• intranet	• focus or advisory groups
• staff meetings	• web site or e-mail list
• employee meetings	• press releases
• bulletin boards	• annual reports
• brown bag lunches	• advertising
• training	• informal discussions

Hints:

- Determine how **proactive** your external communications strategy will be. Select an approach that fits your organization's culture and strategy. For example, will reporting on environmental performance and progress give you an edge over the competition?

- While a proactive external communications program may require more resources, some organizations have found that a proactive strategy can be quite beneficial. Weigh the costs and benefits for yourself, but keep in mind that there might be many interested audiences.



- *Environmental Policy*
- *Environmental Aspects*
- *Objectives & Targets*
- *Structure & Responsibility*
- *Monitoring & Measurement*
- *Management Review*

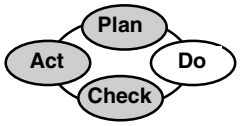
- In communicating with employees, it is helpful to explain not only **what** they need to do but also **why** they need to do it. For example, when describing a requirement based on a regulation, simply saying, "the regulations require it" is not sufficient. Try to explain the purpose behind the rule and why it is important. Also make a clear connection between the requirement and how it applies to each person's job.

- Keep the message **simple** — all communications should be clear, concise, and accurate.

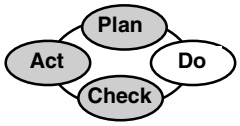
- Managing responses to external inquiries does not have to be burdensome. Use a simple method, such as stapling an inquiry to its written response and then filing them together. The key is to be able to demonstrate that the organization has a process for responding to external inquiries.

☆☆ ***POLLUTION PREVENTION*** ☆☆
and **Public Involvement**

Motorola has conducted Household Waste Electronics Recycling Days for local residents. Working in collaboration with local solid waste authorities, the Company has collected for recycle a variety of home electronic and entertainment equipment, small appliances and other products. At one of these events, over 21 tons of materials were collected, with over 95% of these materials being recycled.

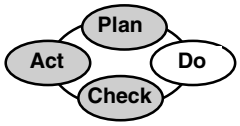


For EPA's Performance Track, organizations must commit to public outreach and performance reporting. Specifically, participating organizations must prepare an annual report on their EMS, a summary of progress on performance commitments, and of their public outreach activities.



Capture the Learning: Communications Worksheet

Who are **our key external stakeholders**? How were these stakeholders **identified**?	
With regard to our organization, what are the **key concerns of these stakeholders**? **How do we know** this?	
What **community outreach efforts** are we making now (or have we made in the recent past)? How **successful** have these efforts been?	
What **methods** do we use for external communications? Which appear to be the most **effective**? Who has primary **responsibility** for external communications?	
How do we **gather and analyze information** to be communicated? Who has **responsibility** for this?	
How do we **communicate internally** (as well as with our suppliers and contractors)? **How effective** are these methods?	
Our next step on communication is to …	



EMS Documentation

Describing the EMS and how its pieces fit together

Rule of thumb:

Try to keep the EMS description document to no more than one page per EMS element

To ensure that your EMS is well understood and operating as designed, you must provide adequate information to the people doing the work. There also may be external parties that want to understand how your EMS is designed and implemented, such as customers, regulators, lending institutions, registrars and the public. For these reasons, the processes that make up your EMS should be documented. A "road map" or description that summarizes how the pieces of the EMS fit together can be a very useful tool.

EMS documentation can be viewed as a series of explanations of the processes your organization has implemented to conform to the selected EMS criteria (such as the elements discussed in the Guide). While you don't need to maintain a single "manual" that include all EMS documentation, you should maintain a summary or description of the EMS that:

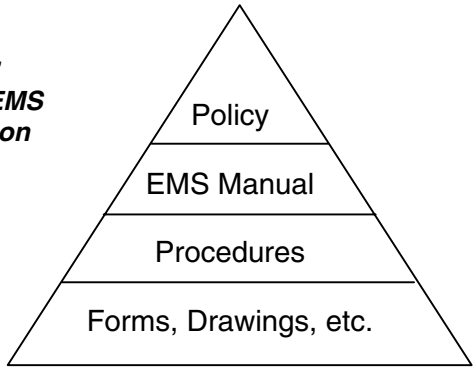
- describes its **core elements** (and how these elements relate to each other), and
- provides **direction** to related documentation.

You can maintain EMS documentation either on paper or electronically. There may be some advantages to maintaining documents electronically, such as easier updating, access control, and ensuring that all readers use the most up-to-date version of a document.

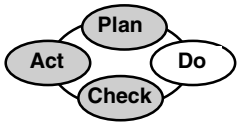
Easy to read and understand
equals
easy to implement

EMS documentation is related to (but not the same as) EMS **records**. EMS **documentation describes** what your system consists of (i.e., what you do), while EMS **records demonstrate** that you are doing what you said you would do. Document control and records management are discussed later in this Guide.

Figure 6:
Hierarchy of EMS Documentation



One way to think about your EMS documentation is to use the figure shown above, which also can be applied to quality or other management system documents.



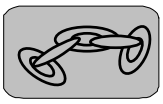
Hints:

- Keep EMS documentation **simple** and choose a format that works best for your organization. Your manual does **not** need to describe every detail of your EMS or how your organization conforms to the selected EMS criteria). Instead, the manual can **provide references** to other documents or procedures.

Use flow charts or other graphics where they help explain the linkages from one system element to another

- Use the **results of your preliminary assessment** to prepare your EMS documentation. In the course of conducting the preliminary assessment, you should have collected or prepared useful material on how your organization satisfies the selected EMS criteria. See the box below on what constitutes EMS documentation.

- The usefulness of your EMS documentation can be improved by including the organization's mission statement, vision, guiding principles, and annual objectives (if these exist). These will help readers understand the organizational context and **how the EMS supports** overall organizational goals.



- *Environmental Policy*
- *Environmental Management Programs*
- *Operational Control*
- *Document Control*

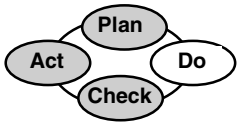
- An EMS manual can be a useful tool for explaining your EMS to new employees, customers, or others. A sample outline for an EMS manual is provided in the **Tool Kit** (see Appendix A).

- EMS documentation should be **updated** as needed, based on any system improvements you put in place. However, if you place **too much detail** in an EMS manual, you might have to update the manual frequently (see first hint, above).

What Constitutes EMS Documentation?

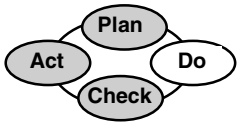
Consider including the following:

- your environmental policy
- your organizational structure and key responsibilities
- a description or summary of **how** your organization satisfies EMS requirements (e.g., "How do we identify environmental aspects?". "How do we control documents?" How do we comply with legal requirements?")
- system-level procedures (e.g., procedure for corrective action)
- activity- or process-specific procedures / work instructions
- other EMS-related documents (such as emergency response plans, training plans, etc.)



Capture the Learning: EMS Documentation Worksheet

Do we have **existing documentation of our EMS**? If yes, how is this EMS documentation **maintained** (electronically? In paper form?)	
Who is responsible for maintaining EMS documentation within our organization?	
Do we have an **EMS manual** or other summary document that describes the key elements of the EMS? If so, does this document describe the **linkages** among system elements?	
What does our EMS documentation consist of? (List components such as environmental policy, EMS manual, activity-level procedures or work instructions, emergency plans, etc.)	
Is our EMS documentation **integrated with other organizational documentation** (such as human resource plans or quality procedures)? If so, how do we ensure proper **coordination** between environmental and these other functions?	
How will we keep our EMS documentation **up-to-date**?	
Our next step on EMS documentation is to …	



Document Control

Ensuring that everyone is working with the right tools

Suggested elements of document control

- ☑ issue / revision date
- ☑ effective date
- ☑ approval (i.e., signature)
- ☑ revision number
- ☑ document number (or other identifier
- ☑ copy number
- ☑ cross references

People in your organization probably use various documents (procedures, work instructions, forms, drawings and the like) as they perform their duties. To ensure that personnel are **consistently** performing their jobs in the right way, the organization must provide them with the proper tools. In the context of an EMS, the "tools" needed are correct and up-to-date procedures, instructions and other documents. Without a mechanism to manage these EMS documents, the organization cannot be sure that people are working with the right tools.

To ensure that everyone is working with the proper EMS documents, your organization should have a **procedure** that describes how such documents are controlled. Implementation of this procedure should ensure that:

- EMS documents can be **located** *(we know where to find them),*
- they are periodically **reviewed** *(we check to make sure they are still valid),*
- current versions are **available** where needed *(we make sure the right people have access to them*), and
- obsolete documents are **removed** *(people don't use the wrong documents by mistake).*

Document control should address:

- *Preparation*
- *Issuance / distribution*
- *Revision*
- *Periodic review*
- *Disposition of obsolete documents*

Your procedure should designate **responsibility and authority** for preparing documents, making changes to them and keeping them up-to-date. In other words, you need to make it clear **who** can actually generate and change documents and **the process for doing so**.

Key Questions:

Is everyone working with the same set of documents?

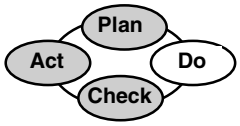
Do people who need access have access?

Getting Started:

- EMS document control requirements are almost a mirror image of the ISO 9000 requirements. Organizations that have or are developing an ISO 9000 management system can enjoy some advantages here.
- Even if your organization doesn't have an ISO 9000 system, you might be better off than you think. Your organization probably has document controls in place for **other business purposes** (such as finance, human resources or purchasing). Assess how well these controls work and if they can be adapted for your EMS.

Hints:

- Don't make your procedure more complicated than it needs to be. While larger organizations often have complex processes for document control, smaller organizations can use simpler processes.



- *EMS Documentation*
- *Operational Control*
- *Records*

- **Limiting distribution** can make the job easier. Does everyone have access to one or a few copies? Determine **how many copies you really need** and where they should be located for **ease of access**.

- If the people that need access to documents are connected to a **local area network** or have access to the organization's **internal web site**, consider using a paperless system. Such systems can facilitate control and revision of documents considerably. There also are a number of **commercial software packages** that can simplify the document control effort.

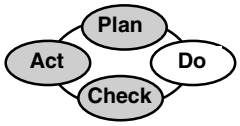
- Prepare a **document control index** that shows all of your EMS documents and the history of their revision. Put this index in your manual. Also, if multiple copies of documents are available at the facility, prepare a **distribution list**, showing who has each copy and where the copies are located.

*The **Tool Kit** contains a sample document control procedure and a sample index of EMS-controlled documents (see Appendix A).*

- As your procedures or other documents are revised, **highlight** the changes (by underlining, boldface, etc.). This will make it easier for the reader to find the changes.

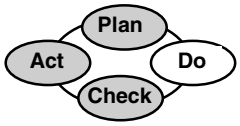
What EMS documents should be controlled? Consider the following:

- ☑ Environmental policy
- ☑ Objectives and targets
- ☑ Roles, responsibilities and authorities
- ☑ EMS description document ("manual")
- ☑ System-level procedures
- ☑ Process- or activity-level procedures / work instructions
- ☑ Related plans (such as emergency response plans)



Capture the Learning: Document Control Worksheet

Do we have an **existing process** for controlling EMS document? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
Who needs **access** to controlled copies of EMS documents? How do we ensure that they have access?	
How do we ensure that EMS documents are **periodically reviewed and updated** as necessary?	
Who has authority to **generate** new documents or **modify** existing ones? How is this process managed?	
How are **users alerted** to the existence of new EMS documents or revisions to existing ones?	
How do we ensure that **obsolete** documents are not used?	
Is our EMS document control process **integrated with other organizational functions** (such as quality)? If so, how do we ensure proper **coordination** between environmental and other functions?	
Our next step on document control is to …	



Operational Control

Building environmental performance into operations and activities

To ensure that you satisfy the commitments in your environmental policy, certain operations and activities must be controlled. Where operations or activities are complex and/or the potential environmental impacts are significant, controls should include documented procedures. Procedures can help your organization to manage its **significant environmental aspects**, ensure regulatory **compliance** and achieve **environmental objectives**. Procedures can also play a prominent role in employee **training**.

Documented procedures should be established where the absence of procedures could lead to **deviations from the environmental policy** (including the commitments to compliance and pollution prevention) or from your **objectives and targets**. Determining **which operations** should be covered by documented procedures and **how** those operations should be controlled is a critical step in designing an effective EMS. Keep in mind that you might need operational controls in order to manage significant aspects or legal requirements, regardless of whether you established objectives and targets for each of them.

In determining which operations and activities need to be controlled, look beyond routine production or service. Activities such as **equipment maintenance**, management of on-site **contractors**, and services provided by **suppliers or vendors** could affect your organization's environmental performance significantly.

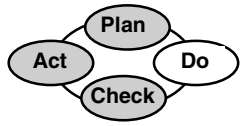
Examples of activities and operations that might require operational controls:

- ☑ management / disposal of wastes
- ☑ approval of new chemicals
- ☑ storage & handling of raw materials and chemicals
- ☑ wastewater treatment
- ☑ operation of paint line
- ☑ operation of plating system
- ☑ management of contractors

Getting Started:

- Start by looking at the **environmental aspects** and **legal requirements** that you identified earlier. Identify the **processes** and other activities that are related to these significant impacts and legal requirements, then consider what types of controls might be needed to manage these aspects and compliance requirements. If you have **flow charts** of these processes (or can develop them), this can simplify the identification of the process steps where some type of control might be appropriate.

- Prepare draft procedures and review them with the people who will need to **implement** them. This will help to ensure that the procedures are appropriate, realistic and practical. Don't be surprised if reviewers come up with a simpler way to achieve the same results!



Hints:

- Review procedures you already have in place to **comply with** environmental and health & safety **regulations.** Some of these may be adequate to control significant impacts (or could be modified to do so). Develop a chart to keep track of what controls are needed:

Procedure is needed (none exists)	Procedure exists, but is not documented	Procedure exists and is documented	No procedure is needed
• • • •			

- **Rules of Thumb**: In general, the more highly skilled and trained your employees are, the less critical documented work instructions become. As work becomes more complex or as the potential impact on the environment increases, the more important these documented work instruction will be.

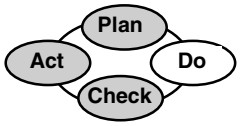
- Once you have identified operations that require control, consider what kinds of maintenance and calibration may be appropriate. **Maintenance** of equipment that could have significant environmental impacts or result in non-compliance should be considered, and the need for a plan to manage such maintenance should not be overlooked. An elaborate preventive or predictive maintenance program is **not** needed in all cases. Assess your existing maintenance program and its effectiveness before making significant changes.

Factors that could affect the need for documented procedures

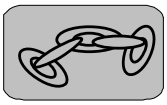
- ☑ risk of activity
- ☑ complexity of activity / methods
- ☑ degree of supervision
- ☑ skills / training of workforce

Hints on Writing Procedures

- Understand the existing process. Start with a flow chart, if one is available. Build on informal procedures where possible.
- Focus on steps needed for consistent implementation.
- Use a consistent format and approach.
- Review draft procedures with employees that will have to implement them. (Better yet, enlist employees to help write them.)
- Keep procedures simple and concise. Excessive detail does not provide better control and can confuse the user.



- Some of your identified environmental aspects may relate to the chemicals, raw materials, or other goods and services you obtain from **vendors/suppliers**. Likewise, the activities of your **contractors** can affect your environmental performance. **Communicate your expectations** (including any relevant procedures) to these business partners.



- *Policy*
- *Environmental Aspects*
- *Legal/Other Requirements*
- *Objectives & Targets*
- *Training*
- *Monitoring & Measurement*

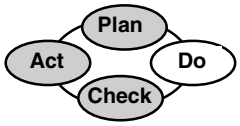
- While the development of procedures can be time-consuming, some organizations have come up with creative ways to reduce the burden. Consider having a college intern or temporary employee interview employees "on the line" to collect information on what employees do and how they do it.

- If your organization uses a "work team" concept, ask the work teams to draft procedures for their work areas (or to modify existing procedures for EMS purposes).

☆☆ *POLLUTION PREVENTION* ☆☆

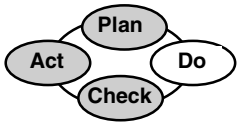
Rochester Midland Corporation, a manufacturer of cleaning and other chemical products, formed a partnership with a cleaning contractor that uses Rochester Midland's products, the owners of a building where the products are used, and building tenants, to lessen the risks associated with cleaning products. The partners began by developing common goals, identifying alternative cleaning products and processes, and identifying opportunities to reduce risks to building occupants and cleaning staff. Over a two-month period, they were able to: reduce chemical exposures; improve tenant satisfaction; improve communication, awareness, and training; achieve a 50% reduction in cleaning products; and achieve measurable cost savings.

For EPA's Performance Track program, organizations must have operation and maintenance programs for equipment and operations that relate to legal compliance and significant environmental aspects



Capture the Learning: Operational Controls Worksheet

Have we **identified operations and activities** associated with significant environmental aspects, legal requirements and environmental objectives? If not **how will this be accomplished**? Who should be **involved**?	
What operations and activities are associated with **significant environmental aspects**?	
What operations and activities are associated with **legal requirements**?	
What operations and activities are associated with environmental **objectives and targets**?	
How are the above operations and activities **controlled**? (list methods)	
How do we know whether these **controls are adequate** (i.e., to manage significant aspects, to ensure compliance, to achieve objectives?	
How do we **train** employees and contractors on relevant operating controls?	
If **new controls** are needed (or **existing ones need to be revised**), what is our **process** for doing so? Who needs to be **involved** in this process?	
Our next step on operational control is to …	



Emergency Preparedness and Response

Minimizing the impacts of uncontrolled events

Despite an organization's best efforts, the possibility of accidents and other emergency situations still exists. Effective **preparation and response** can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, reduce asset losses and minimize downtime.

Don't think only about response – focus on how to prevent accidents in the first place

An effective emergency preparedness and response program should include provisions for:

- **assessing the potential** for accidents and emergencies;
- **preventing** incidents and their associated environmental impacts;
- plans / procedures for **responding** to incidents;
- periodic **testing** of emergency plans / procedures; and,
- **mitigating impacts** associated with these incidents.

Review prior accidents and incidents as one guide to where future incidents may occur.

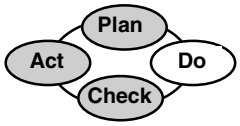
Consistent with the focus on continual improvement, it is important to **review** your emergency response performance **after an incident** has occurred. Use this review to determine if more training is needed or if emergency plans / procedures should be revised.

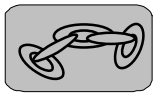
USEFUL INFORMATION SOURCES:

- Material safety data sheets
- Plant drawings
- Process flow diagrams
- Piping and instrumentation diagrams
- Design codes and standards
- Specifications on safety systems (alarms, sprinklers, etc.)

Getting Started:

- This is another area where you should not have to start from scratch. Several environmental and health and safety **regulatory programs** require emergency plans and/or procedures. Look at what you have now and assess how well it satisfies the items discussed above.
- Two planning components that many organizations overlook are how they **identify the potential for accidents** and emergencies and how they **mitigate the impacts** of such incidents. A cross-functional team (with representatives from engineering, maintenance and environmental health & safety, for example) can identify most potential emergencies by asking a series of "what if" questions related to hazardous materials, activities, and processes employed at the site. In addition to normal operations, the team should consider start-up and shutdown of process equipment, and other abnormal operating conditions.





- ***Environmental Aspects***
- ***Legal/Other Requirements***
- ***Training & Awareness***
- ***Communication***
- ***Document Control***

- Ask yourself: Does **everyone** (including new employees) know what to do in an emergency? How would contractors or site visitors know what to do in an emergency situation?
- Communicate with **local officials** (fire department, hospital, etc.) about potential emergencies at your site and how they can support your response efforts.

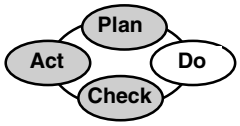
Hints:

- **Mock drills** can be an excellent way to reinforce training and get feedback on the effectiveness of your plans / procedures.
- **Post copies** of the plan (or at least critical contact names and phone numbers) around the site and especially in areas where high hazards exist. Include phone numbers for your on-site emergency coordinator, local fire department, local police, hospital, rescue squad, and others as appropriate.
- **Revise and improve your plan** as you learn from mock drills, training or actual emergencies.

Checklist for Emergency Preparedness and Response Plans

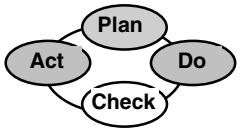
Does your plan describe the following:

- ☑ potential emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)?
- ☑ hazardous materials used on-site (and their locations)?
- ☑ key organizational responsibilities (including emergency coordinator)?
- ☑ arrangements with local emergency support providers?
- ☑ emergency response procedures, including emergency communication procedures?
- ☑ locations and types of emergency response equipment?
- ☑ maintenance of emergency response equipment?
- ☑ training / testing of personnel, including the on-site emergency response team (if applicable)?
- ☑ testing of alarm / public address systems?
- ☑ evacuation routes and exits (map), and assembly points?



Capture the Learning: Emergency Preparedness & Response Worksheet

Have we **reviewed our operations and activities** for potential emergency situations? If not **how will this be accomplished**? Who should be **involved**?	
Do our existing emergency plans describe how we will **prevent** incidents and associated environmental impacts? If not **how will this be accomplished**? Who should be **involved**?	
Have we **trained personnel** on their roles and responsibilities during emergencies?	
What **emergency equipment** do we maintain? How do we know that this equipment is adequate for our needs?	
How do **contractors and other visitors** know what to do in an emergency situation?	
When was our last emergency **drill**? Is there a plan / schedule for conducting future drills?	
Have we established a **feedback loop** so we can learn from our experiences?	
Our next step on emergency preparedness & response is to …	



Monitoring and Measurement

Assessing how well the system is performing

"If you can't measure it, you can't manage it."

- Peter Drucker

An EMS without effective monitoring and measurement processes is like driving at night without the headlights on —you know that you are moving but you can't tell where you are going! Monitoring and measurement enables you to:

- **evaluate** environmental **performance**;
- **analyze root causes** of problems;
- **assess compliance** with legal requirements;
- **identify** areas requiring **corrective action**, and,
- **improve performance** and **increase efficiency**.

In short, **monitoring helps you manage your organization better**. Pollution prevention and other strategic business opportunities are identified more readily when current and reliable data is available.

Which operations and activities can have significant environmental impacts?

What are the key characteristics of these operations and activities?

How do we measure these characteristics?

Your organization should **develop procedures** to:

- **monitor key characteristics** of operations and activities that can have significant environmental impacts and/or compliance consequences;
- **track performance** (including your progress in achieving objectives and targets);
- **calibrate and maintain** monitoring equipment; and,
- through internal audits, periodically **evaluate your compliance** with applicable laws and regulations.

Getting Started:

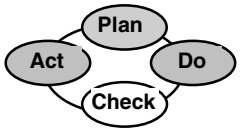
- Monitoring and measuring can be resource-intensive. One of the most important steps you can take is to clearly **define your needs**. While collecting information is clearly important, resist the urge to collect data "for data's sake."

- Review the kinds of monitoring you do now for **regulatory compliance** and other purposes (such as quality or health and safety management). How well does this serve your EMS purposes? What additional monitoring or measuring might be needed?

- You can start **with a relatively simple** monitoring and measurement system, then build on it as you gain experience.

Attributes of effective measurement programs

- ☑ simple
- ☑ flexible
- ☑ consistent
- ☑ ongoing
- ☑ produce reliable data
- ☑ communicate results



Hints:

- **Monitoring key process characteristics**: Many management theorists endorse the concept of the "**vital few**" — that is, that a limited number of factors can have a substantial impact on the outcome of a process. The key is to figure out what those factors are and how to measure them. Process mapping can help you determine what those factors might be.

EPA policies provide incentives for effective compliance management programs, including self-reporting. See "Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations" and "Small Business Compliance Policy" in the April 11, 2000 Federal Register.

- Most effective environmental measurement systems use a combination of **process** and **outcome** measures. Outcome measures look at results of a process or activity (such as the amount of waste generated or the number of spills that took place). Process measures, on the other hand, look at "upstream" factors, such as the amount of paint used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for your organization.

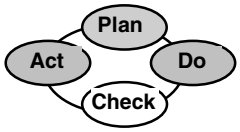
- **Equipment calibration**: Identify process equipment and activities that truly affect your environmental performance. As a starting point, look at those **key process characteristics** you identified earlier. Some organizations place critical monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and make employees aware of which instruments are most critical for environmental monitoring purposes. Some organizations find it is more cost-effective to subcontract calibration and maintenance of monitoring equipment than to perform these functions internally.

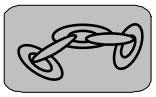
Employees should have a mechanism to report regulatory violations (or other EMS issues) without fear of retaliation by their employer

- **Assessing regulatory compliance**: Determining your compliance status on a regular basis is very important. You should have a procedure to systematically **identify, correct, and prevent** violations. Effectiveness of the compliance assessment process should be considered during EMS **management review**. EPA encourages "systematic discovery" of regulatory violations, which means detecting potential violations through environmental audits or compliance management systems that show due diligence in preventing, detecting and correcting violations.

Focus on things that you can do something about

- **Evaluating environmental performance**: Go back and look at your significant **environmental aspects** and the **objectives and targets** associated with those significant aspects. What information will you need to determine if the company is achieving its objectives and targets? The example on the following page shows the relationship among monitoring and measurement processes, operational controls, and operations with significant environmental aspects.





- *Environmental Aspects*
- *Legal/Other Requirements*
- *Objectives & Targets*
- *Operational Control*
- *Corrective Action*
- *Management Review*

- **Selecting performance indicators:** Performance indicators can help you to understand how well your operational controls and management processes are working**.** Start by identifying a few performance indicators that are:
  - **simple** and understandable;
  - **objective**;
  - **measurable**; and
  - **relevant** to what your organization does (i.e., its activities, products, and services)

  The data that you collect on your performance indicators also can be quite helpful during **management reviews**. So, select indicators that will provide top management with the information it needs to make decisions about the EMS.

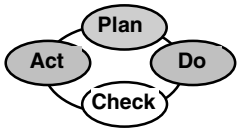
  Make sure you can commit the necessary **resources** to track performance information over time. It is OK to **start small** and build over time as you gain experience in evaluating your performance. Keep in mind that **no single measurement** will tell your organization how it is doing in the environmental area.

The value of periodic monitoring:

St. Joseph's Mercy Hospital noticed an increase in its discharge of silver to the local wastewater treatment plant. They investigated what had changed at the Hospital and found that a new x-ray processor had been installed without a silver recovery system. Once the recovery system was installed, silver discharge levels returned to permitted levels.

- **Communicating performance**: People respond best to information that is meaningful to "their world." Putting environmental information in a form that is **relevant to their function** increases the likelihood they will act on the information. Be sure to link your measurement program with your **communications** program and other elements of the EMS (such as management reviews, as discussed later).

- **Compliance auditing guidance**: The USEPA has prepared guidance documents and protocols for conducting environmental compliance audits under a number of its regulatory programs. For more information, check the EPA web site at www.epa.gov/oeca/index.html.

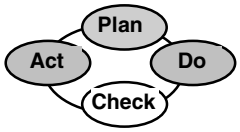


Linking Monitoring Processes to Operational Controls: One Example

Operation with Significant Environmental Aspect(s)	Operational Controls	Key Characteristics of Operation or Activity	Monitoring or Measurement Methods	Equipment Calibration Needs
Surface Coating Operation	• Approved list of coatings	• Type of coating	• Compare to approved list	• None
	• Coating work instruction	• Rate of application	• Measure quantity applied	• Flow meter
		• Frequency of application	• Use coating log book	• None
	• Permit report procedure	• Emissions of VOCs	• Calculate based on use	• Flow meter
Liquid Waste Storage	• Generator procedure	• Use of proper containers	• Inspections of storage area	• None
		• Segregation of incompatibles	• Inspections of storage area	• None
	• Storage area procedure	• Availability of spill equipment	• Inspections of storage area	• None

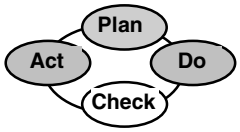
Examples of EMS Performance Indicators

- ☑ Pounds of VOC emitted per unit of production
- ☑ Pounds of hazardous waste generated per year
- ☑ Percentage of employees completing environmental training
- ☑ Average time for resolving nonconformities
- ☑ Energy use per unit of production
- ☑ Percentage of solid waste recycled / reused



Capture the Learning: Monitoring and Measurement Worksheet

Have we **identified operations and activities** associated with significant environmental aspects, legal requirements and environmental objectives? If, not how will this be accomplished?	
What type(s) of monitoring and measurement do we need to ensure that **operational controls** are being implemented correctly?	
What type(s) of monitoring and measurement do we need to ensure that we are **complying** with **applicable legal requirements?**	
What type(s) of monitoring and measurement do we need to ensure that we are **achieving** our environmental **objectives & targets?**	
How do we identify the **equipment** used for any of the monitoring or measurement listed above? If not how will this be accomplished?	
How will we ensure that monitoring and measurement equipment is properly **calibrated and maintained**?	
What process do we have to periodically **evaluate compliance with legal requirements**? How effective is this process?	
Our next step on monitoring and measurement is to …	



Nonconformance and Corrective / Preventive Action

Fixing EMS problems – and avoiding them in the future

Key Steps

- ☑ identify the problem
- ☑ investigate to identify the root cause
- ☑ come up with solution
- ☑ implement solution
- ☑ document solution
- ☑ communicate solution
- ☑ evaluate effectiveness of solution

No EMS is perfect. You will probably identify problems with your system (especially in the early phases) through audits, measurement, or other activities. Over time, your EMS will need to change as your organization changes and grows. **To deal with system deficiencies**, your organization needs a process to ensure that:

- **problems** (including nonconformities) are **identified** and **investigated**;
- root **causes** are **identified**;
- corrective and preventive **actions** are **identified** and **implemented**; and,
- **actions** are **tracked** and their **effectiveness verified**.

EMS nonconformities and other system deficiencies (such as legal noncompliance) should be analyzed to detect patterns or **trends**. Identifying trends allows you to anticipate and **prevent** future problems.

Focus on correcting **and** preventing problems. Preventing problems is generally cheaper than fixing them after they occur (or after they reoccur). Start thinking about problems as **opportunities to improve!**

"Nonconformance" means…

- system does not meet the EMS criteria

-- or --

- implementation is not consistent with the EMS description

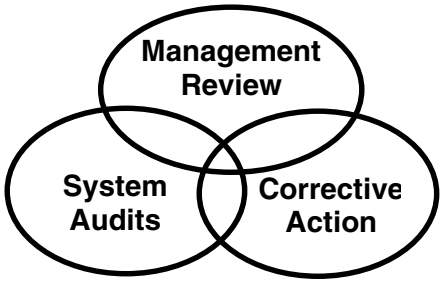
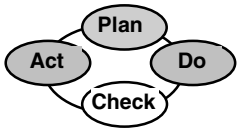


Figure 7

= System Improvement

Hints:

- If your organization has an ISO 9000 management system, you should already have a corrective and preventive action process for **quality** purposes. Use this as a model (or integrate with it) for EMS purposes.
- Some organizations find that they can **combine** some elements of their management review and corrective action processes. These organizations use a portion of their management review meetings to review noncomformities, discuss causes and trends, identify corrective actions and assign responsibilities.



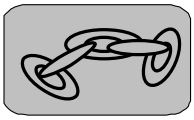
Why do EMS problems occur?
Typical causes include:

- ☑ poor communication
- ☑ faulty or missing procedures
- ☑ equipment malfunction (or lack of maintenance)
- ☑ lack or training
- ☑ lack of understanding (of requirements)
- ☑ failure to enforce rules
- ☑ corrective actions fail to address root causes of problems

- The amount of planning and documentation needed for corrective & preventive actions will vary with the **severity** of the problem and its potential environmental **impacts**. Don't go overboard with bureaucracy — simple methods often work quite effectively.

- Once you document a problem, the organization must be committed to **resolving it in a timely manner**. Be sure that your corrective & preventive action process specifies **responsibilities** and **schedules** for completion. Review your **progress** regularly and follow up to ensure that actions taken are effective.

- Make sure your actions are based on good information and analysis of causes. While many corrective actions may be "common sense," you need to **look beneath the surface** to determine **why** problems occur. Many organizations use the term "**root cause**" in their corrective and preventive action processes. While this term can be used to describe a very formal analysis process, it can also mean something simpler – looking past the obvious or immediate reason for a nonconformance to determine why the nonconformance occurred.



- *Legal & Other Requirements*
- *Operational Control*
- *Monitoring & Measurement*
- *EMS Audits*
- *Management Review*

- **Rule of thumb**: Corrective actions should (1) resolve the immediate problem (2) consider whether the same or similar problems exist elsewhere in the organization, and (3) prevent the problem from recurring. They also should define the responsibilities and schedules associated with these three steps.

- Initially, most EMS problems may be identified by your internal auditors. However, over the long run, most problems and good ideas may come from the people doing the work. **This should be encouraged**. Find ways to get employees involved in the system improvement process (for example, via suggestion boxes, contests and incentive programs).

People doing the work are often in the best position to see problems and suggest solutions

The Tool Kit contains a sample corrective action procedure and tracking log (see Appendix A)

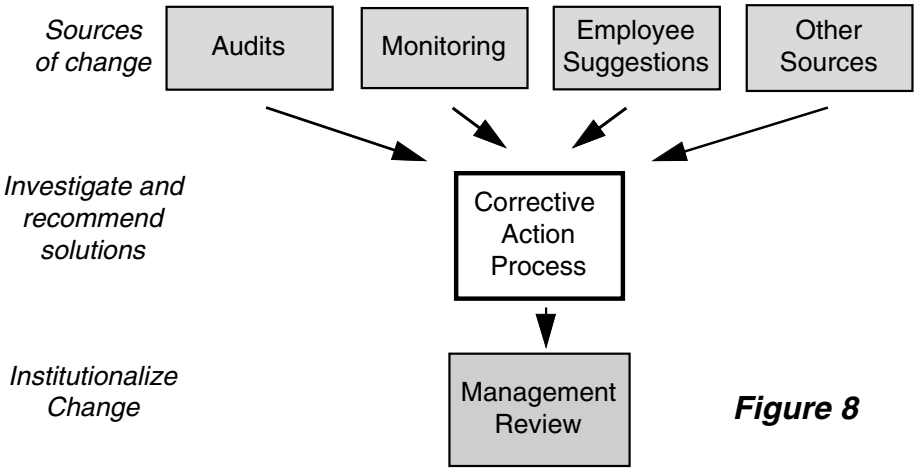
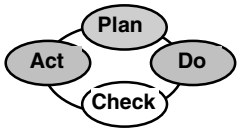
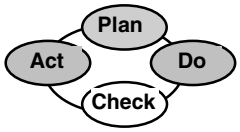


Figure 8



Capture the Learning: Corrective & Preventive Action Worksheet

Do we have an **existing process** for corrective and preventive action? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
How are **nonconformities** and other potential system deficiencies **identified**? (List methods such as audits, employee suggestions, ongoing monitoring, etc.)	
How do we **determine the causes** of nonconformities and other system deficiencies? How is this information used?	
How do we **track the status** of our corrective and preventive actions?	
How is / can **information** on nonconformities and corrective actions **be used within the EMS** (for example, in management review meetings, in employee training sessions, in review of procedures, etc.)	
How do we **ensure the effectiveness** of our corrective and preventive actions?	
Our next step on corrective and preventive action is to …	



Records

Evidence that the EMS is working as intended

What are "records"?

Records provide evidence that the processes that make up your EMS are being implemented as described.

The value of records management is fairly simple — you should be able to **demonstrate** that your organization is actually implementing the EMS as designed. While records have value internally, over time you may need to provide **evidence of EMS implementation to external parties** (such as customers, a registrar, or the public). Records management is sometimes seen as bureaucratic, but it is difficult to imagine a system **operating consistently** without accurate records.

The basics of records management are straightforward: you need to decide **what** records you will keep, **how** you will keep them and for **how long**. You should also think about how you will **dispose** of records once you no longer need them.

If your organization has an ISO 9000 (or other) management system, you should have a process in place for managing records. This process could be adapted for EMS purposes.

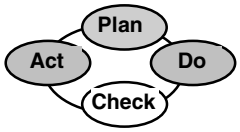
Hints:

- Start by **identifying** what **EMS records are required**. Look at your other procedures and work instructions to determine **what evidence is needed to demonstrate implementation**. Also consider records that are required by various **legal requirements**.
- **Focus on records that add value —** avoid bureaucracy. If records have no value, then don't collect them. The records you choose to keep should be **accurate and complete**.
- You may need to generate certain **forms** as you develop your EMS. When these forms are filled out, they become records. Forms should be **simple and understandable** for the users.

Records should be important to the operation of the EMS, including your regulatory compliance efforts

- Establish a records retention policy and stick to it. Make sure that your policy takes into account **records retention requirements specified in applicable environmental regulations**.
- In designing your records management process, be sure to consider:

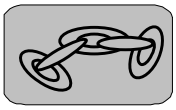
  - who needs access?
  - to what records?
  - in what circumstances?



Key Questions

- ☑ what records are kept?
- ☑ who keeps them?
- ☑ where are they kept?
- ☑ how are they kept?
- ☑ how long are they kept?
- ☑ how are they accessed?
- ☑ how are they disposed?

- If your organization uses computers extensively, consider using an electronic EMS records management system. Maintaining records electronically can provide an excellent means for rapid retrieval of records as well as controlling access to sensitive records.
- Think about which records might require additional **security**. Do you need to restrict access to certain records? Should a back-up copy of critical records be maintained at another location?



Virtually every element of an EMS can result in the generation of records

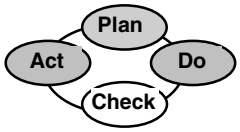
Types of Records You Might Maintain (Examples):

- legal, regulatory and other code requirements
- results of environmental aspects identification
- reports of progress towards meeting objectives and targets
- permits, licenses and other approvals
- job descriptions and performance evaluations
- training records
- EMS audit and regulatory compliance audit reports
- reports of identified nonconformities, corrective action plans and corrective action tracking data
- hazardous material spill / other incident reports
- communications with customers, suppliers, contractors and other external parties
- results of management reviews
- sampling and monitoring data
- maintenance records
- equipment calibration records

The Tool Kit contains a tool for organizing your filing system (see Appendix A). You can copy the pages, cut out the tabs, and use them to set up your filing system.

Capture the Learning: Records Management Worksheet

Have we **identified what records** need to be maintained? Where are this defined?	
Have we determined records **retention times**? Where is this defined?	
Have we established an effective **storage and retrieval** system?	
Our next step on records is to …	



EMS Auditing

Objective evidence of conformance with EMS requirements

Audits are vital to continual improvement of your EMS

Once your organization has established its EMS, verifying the implementation of the system will be critical. To identify and resolve EMS deficiencies you must **actively seek them out**.

In a smaller organization, periodic audits can be particularly valuable. Managers are often so close to the work that they may not see problems or bad habits that have developed. Periodic EMS audits will establish whether **all** of the requirements of the EMS are being carried out **in the specified manner**.

For your EMS audit program to be effective, you should:

- develop audit **procedures** and protocols;
- determine an appropriate audit **frequency**;
- select and **train** your auditors; and,
- maintain audit **records.**

Results of your EMS audits should be linked to the **corrective** and **preventive action** process (described earlier).

While they can be time-consuming, EMS audits are critical to EMS effectiveness. Systematic identification and reporting of EMS deficiencies to management provides a great opportunity to:

- maintain **management focus** on the environment,
- **improve** the EMS and its performance, and
- ensure its **cost-effectiveness**.

EMS Audit

"A systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management.

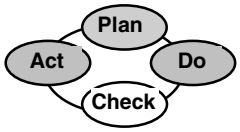
- ISO 14001

Getting Started:

- ***How frequently do we need to audit?*** To determine an appropriate frequency of your EMS audits, consider the following factors:

  - the nature of your **operations** and **activities**,
  - your significant environmental **aspects / impacts** (which you identified earlier),
  - the results of your **monitoring** processes, and
  - the results of **previous audits**.

As a rule of thumb, all parts of the EMS should be audited **at least annually**. You can audit the entire EMS at one time or break it down into discrete elements for more frequent audits. (There may be advantages to conducting frequent audits, but the decision is up to you).



Audit procedures should describe:

- ☑ audit planning
- ☑ audit scope (areas and activities covered)
- ☑ audit frequency
- ☑ audit methods
- ☑ key responsibilities
- ☑ reporting mechanisms
- ☑ recordkeeping

Traits of a good auditor:

- ☑ ***Independent (of the activity being audited***
- ☑ ***Objective***
- ☑ ***Impartial***
- ☑ ***Tactful***
- ☑ ***Attentive to detail***

Sources of Evidence

- ☑ interviews
- ☑ document review
- ☑ observation of work practices

- ***Who will perform the audits?*** You should select and train EMS auditors. Auditor training should be both **initial and ongoing**. Commercial EMS auditor training is available, but it might be more cost-effective to link up with businesses or other organizations in your area (perhaps through a trade association) to sponsor an auditor training course. Some local community colleges also offer EMS auditor training.

  Auditors should be trained in **auditing techniques** and **management system** concepts. Familiarity with environmental regulations, facility operations, and environmental science can be a big plus, and in some cases may be essential to adequately assess the EMS.

  Some auditor training can be obtained **on-the-job**. Your organization's first few EMS audits can be considered part of auditor training, but make sure that an **experienced auditor** leads or takes part in those "training" audits.

  Auditors should be **independent of the activities being audited**. This can be a challenge for small organizations. See the box on next page for ideas.

  If your company is registered under **ISO 9000**, consider using your internal quality auditors as EMS auditors. While some additional training might be needed for EMS auditing, many of the required skills are the same.

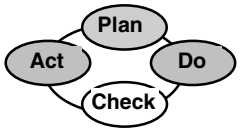
- ***How should management use audit results?*** Management can use EMS audit results to **identify trends or patterns** in EMS deficiencies. The organization also should ensure that identified system gaps or deficiencies are **corrected** in a timely fashion and that corrective actions are **documented**.

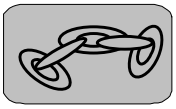
Hints:

- Your EMS audits should focus on **objective evidence of conformance**. During an audit, auditors should resist the temptation to evaluate, for example, **why** a procedure was not followed — that step comes later.

- During an audit, auditors should **review identified deficiencies** with people who work in the relevant area(s). This will help the auditors verify that their audit findings are correct. This also can serve as refresher training on EMS requirements for employees.

- If possible, train at least **two** people as internal auditors. This will allow your auditors to work as a **team**. It also allows audits to take place when one auditor has a schedule conflict, which is often unavoidable in a small organization!





- ***Structure & Responsibility***
- ***Training & Awareness***
- ***Corrective Action***
- ***Management Review***

Options for Auditor Independence
- Barter for audit services with other small organizations in our area
- Use external auditors
- Have office personnel audit production areas (and vice versa)

Results of regulatory compliance audits are often good indicators of EMS deficiencies. Use compliance audit findings to guide your EMS efforts

- **Before you start** an audit, be sure to **communicate** the audit scope, criteria, schedule, and other pertinent information to the people in the affected area(s). This helps to avoid confusion and facilitate the audit process.

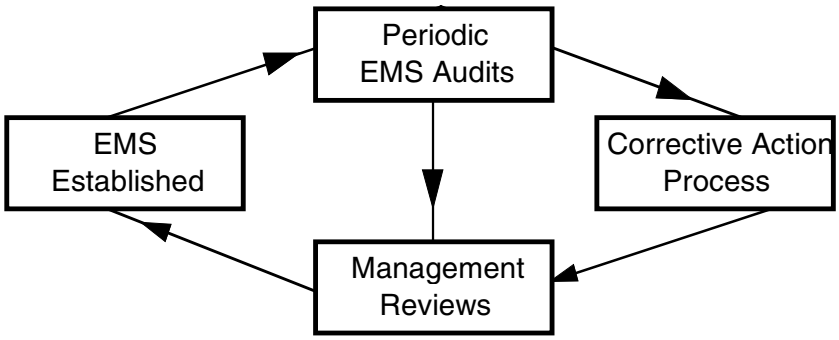
- Consider **integrating** your EMS and regulatory compliance audit processes. **But** keep in mind that these audit processes have different purposes. While you might want to **communicate the results** of EMS audits widely within your organization, the results of compliance audits might need to be communicated in a more limited fashion (in order to maintain attorney-client or attorney work product privilege, for example).

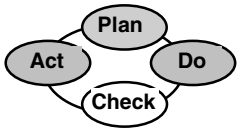
*The **Tool Kit** includes a sample EMS audit procedure (see Appendix A)*

- An EMS audit **is** a check on how well your system meets your own established EMS requirements. An EMS audit is **not** an assessment of how well employees do their jobs. Auditors should avoid the "gotcha" mentality. Audits should be judged on the **quality** of findings, rather than the number.

Figure 9:
Linkages among EMS audits, corrective action and management reviews

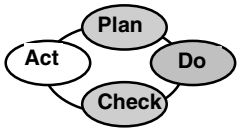
Even if you have an effective internal audit program, consider periodic external audits to ensure objectivity





Capture the Learning: EMS Auditing Worksheet

Have we developed an **EMS audit program**? If, not how will this be accomplished? **Who need to be involved** in this process?	
Is there **another audit program** with which our EMS audits could be **linked** (for example, quality or health & safety management system audits)?	
Have we determined an appropriate **audit frequency**? What is the **basis** for the existing frequency? Should the frequency of audits be modified?	
Have we **selected** EMS auditors? What are the **qualifications** of our auditors?	
What **training** has been conducted or is planned for our EMS auditors?	
Have we **conducted EMS audits** as described in the audit program? Where are the results of such audits described?	
How are the results of EMS audits **communicated** to top management?	
How are the **records** of these audits maintained?	
Our next step on EMS auditing is to …	



Management Review

Closing the continual improvement loop

An effective EMS is one that:

- ☑ ***meets the organization's needs***
- ☑ ***produces results***
- ☑ ***conforms to EMS criteria***
- ☑ ***has staying power***

Just as a person should have periodic physical exams, your EMS must be reviewed periodically by top management to stay "healthy." Management reviews are one **key to continual improvement** and to ensure that the EMS continues to meet your organization's needs over time.

Management reviews also offer a great opportunity to keep your EMS **efficient and cost-effective**. For example, some organizations have found that certain procedures and processes initially put in place were not needed to achieve their environmental objectives or control key processes. **If EMS procedures and other activities don't add value, eliminate them.**

The key question that a management review seeks to answer:

> "Is the system **working**?" (i.e., is it <u>suitable, adequate and effective,</u> given our needs?)

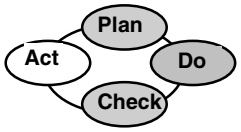
Hints:

- Two kinds of people should be involved in the management review process:
  - people who have the right **information** / knowledge,
  - people who can **make decisions** about the organization and its resources (top management).
- Determine management review frequency that will work best for your organization. Some organizations combine these reviews with other meetings (such as director meetings). Other organizations hold "stand-alone" reviews. At a minimum, consider conducting management reviews at least once per year.
- During management review meetings, make sure that someone records what **issues** were discussed, what **decisions** were arrived at, and what **action** items were selected. Results of management reviews should be **documented**.
- Management reviews should assess how **changing circumstances** might influence the suitability, effectiveness or adequacy of your EMS. Changing circumstances might be **internal** to your organization (such as new facilities, new raw materials, changes in products or services, new customers, etc.) or might be **external** factors (such as new laws, new scientific information or changes in adjacent land use).

"Many of the benefits of an EMS cannot be anticipated beforehand. You will have to discover them as pleasant surprises at some point after implementation. They <u>will</u> be there.

Milan Screw Products

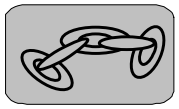
*The **Tool Kit** contains a sample Management Review procedure. (See Appendix A)*



Information sources to consider:

- Audit results
- Internal suggestions
- External communications
- Progress on objectives and targets
- Other environmental performance measures
- Reports of emergencies, spills, other incidents
- New or modified legislation and regulations
- New scientific / technical data on materials and processes used by the organization

Consider holding management review meetings "after hours" to minimize disruption of business.



All elements of the EMS should be considered as part of Management Review

- After documenting the action items arising from your management review, be sure that someone **follows-up**. Progress on action items should be tracked to completion.
- As you assess potential changes to your EMS, consider **other organizational plans and goals**. In this way, environmental decision-making can be integrated into your overall management and strategy.

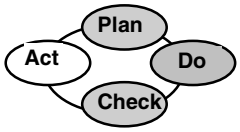
Management Review: Questions to Ponder

- Did we achieve our **objectives and targets**? If not, why not? Should we modify our objectives?
- Is our environmental **policy** still relevant to what we do?
- Are **roles and responsibilities** clear, do they make sense and are they communicated effectively?
- Are we applying **resources** appropriately?
- Are our **procedures** clear and adequate? Do we need other controls? Should we eliminate some of them?
- Are we **fixing problems** when we find them?
- Are we **monitoring our EMS** (e.g., via system audits)? What do the results of those audits tell us?
- What effects have **changes in materials, products, or services** had on our EMS and its effectiveness?
- Do changes in **laws or regulations** require us to change some of our approaches?
- What other changes are coming in the near term? What impacts (if any) will these have on our EMS?
- What **stakeholder concerns** have been raised since our last review? How are concerns being addressed?
- Is there a **better way**? What can we do to **improve**?

The Washtenaw County Home Toxics Reduction Program (HTRP) successfully linked its management review process with its new Business Improvement Process (BIP). HTRP used its environmental objectives as input to the BIP and reviewed progress annually to determined what worked and to make adjustments, where needed. The output of BIP will feed into the County's budgeting process.

YOU SHOULD NOW UNDERSTAND ALL OF THE ELEMENTS OF AN EFFECTIVE EMS !!

NOW YOU'RE READY TO "GO"! (See next section)



Capture the Learning: Management Review Worksheet

Do we have an **existing process** for conducting management reviews? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
When is the **best time** for us to implement this process? Can this effort be **linked** to an existing business process (such as our budget, annual planning or auditing cycles?)	
How **frequently** are management reviews? What is the **basis** for this frequency? Should we conduct reviews more or less frequently?	
Who is responsible for **gathering the information** needed to conduct management reviews? Who is responsible for **presenting** this information?	
How do we ensure that **changing circumstances** (both internal and external to the organization) are considered I this process?	
How do we ensure that the **recommendations** of management reviews are **tracked and acted upon**?	
Our next step on management review is to …	

Section 5 : GO! (Roadmap for EMS Development)

A sequence of activities for building an EMS from the ground up

Ford Motor Company conducted ISO 14001 workshops for its suppliers.. Part of these workshops was devloted to a discussion of how to "launch" the EMS effort through a set of implementation steps.

Stories, examples needed here

Once you gain an understanding the individual elements of an EMS, you can begin the process of **putting these elements in place**. Each of the individual EMS elements was described in detail in Section 4. A number of "up front" EMS planning tasks (such as gaining top management commitment) were described in Section 3.

Experience of many organizations shows that the **order** in which EMS implementation activities should take place is not always obvious or intuitive. Further, the optimal **sequence of implementation activities** does not necessarily follow the order in which elements are described in various EMS models, such as ISO 14001. A logical sequence can save time and money and minimize the "false starts" an organization might make.

This section provides a **step by step action plan** for developing and implementing the elements of an EMS. It describes a logical sequence or "roadmap" for planning and implementing EMS elements and explains how this sequence can be important in building an effective EMS.

Keep in mind that this is just one way to do the job– you may find other approaches that work just as well.

Figure 10 illustrates the suggested implementation process flow. Each of the steps (and a rationale for their sequence) is discussed below.

A few **hints** to keep in mind as you build your EMS:

- **You may already have some EMS elements in place**, as indicated by the preliminary review that you performed earlier (see Section 3 for more details).
- Make sure to build in the **links between elements**. Refer back to Section 4 for information on the key links. The effectiveness of your EMS depends as much on the strength of its links as it does on the strength of the individual components themselves.
- For many EMS elements, you will need to **design and implement a process**. In these cases, you also should consider **documenting** the process in the form of a **procedure**.

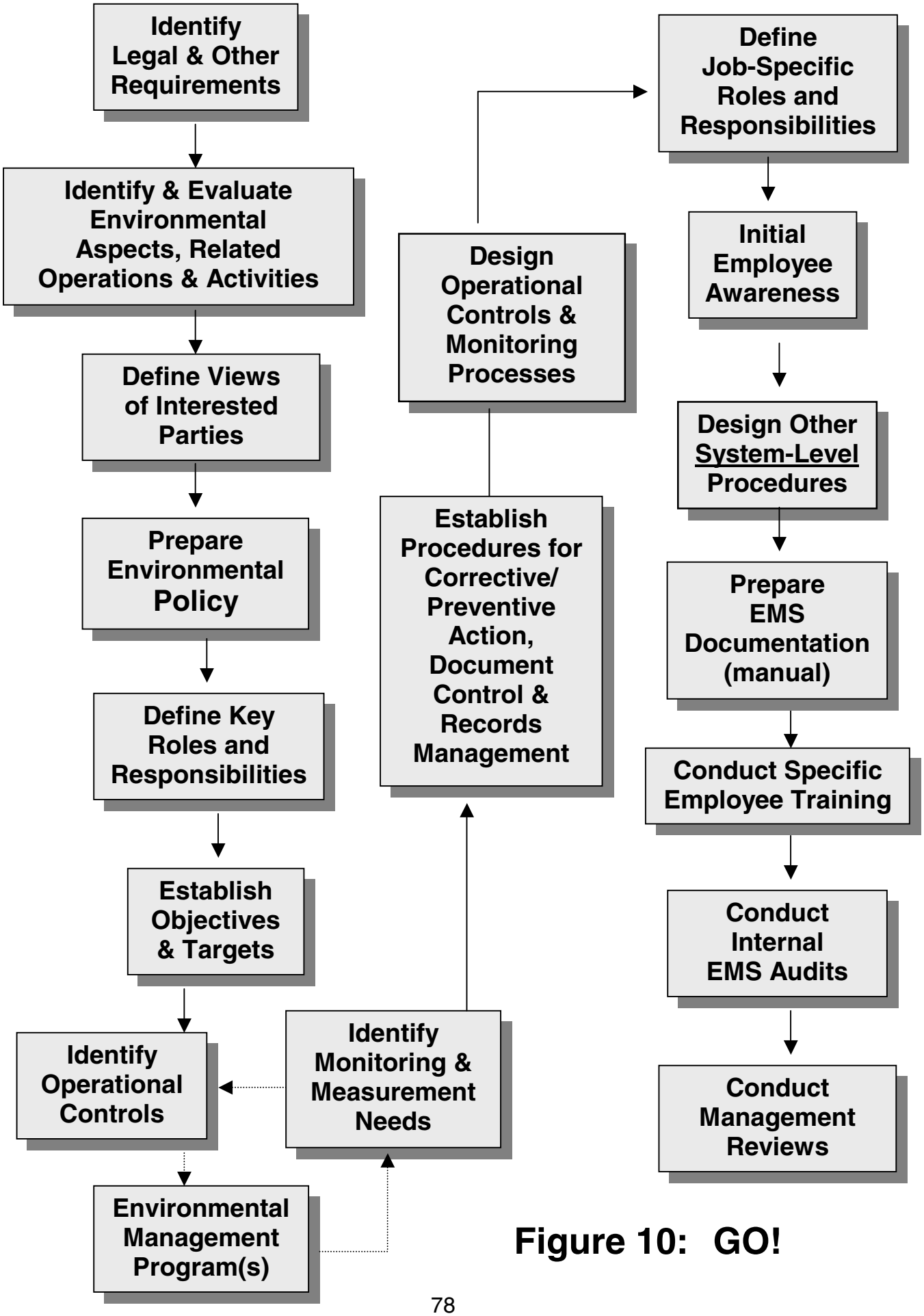
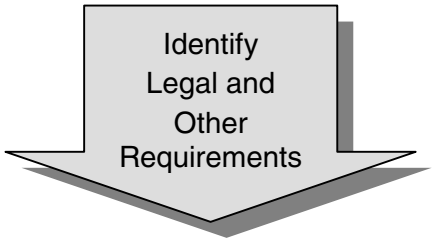

Identify Legal & Other Requirements
Identify & Evaluate Environmental Aspects, Related Operations & Activities
Define Views of Interested Parties
Prepare Environmental Policy
Define Key Roles and Responsibilities
Establish Objectives & Targets
Identify Operational Controls
Environmental Management Program(s)
Identify Monitoring & Measurement Needs
Establish Procedures for Corrective/ Preventive Action, Document Control & Records Management
Design Operational Controls & Monitoring Processes
Define Job-Specific Roles and Responsibilities
Initial Employee Awareness
Design Other System-Level Procedures
Prepare EMS Documentation (manual)
Conduct Specific Employee Training
Conduct Internal EMS Audits
Conduct Management Reviews

Figure 10: GO!

Creating Your EMS: Step by Step



A first step in the EMS-building process is **understanding the legal and other requirements** that apply to what you do (i.e., that apply to your products, activities and services). This step is important for understanding compliance obligations and how these obligations affect the overall EMS design. For example, you might have an operation that is covered by an air quality permit or might provide a service that results in the generation of regulated wastes. Your EMS should include processes to ensure that legal requirements are addressed when you conduct or change such operations.

Your EMS should be designed to help you accomplish more that just compliance with applicable laws and regulations, but these compliance requirements should be a major consideration. Performing this step first allows you to understand how these legal requirements relate to the environmental aspects and impacts of your products, activities and services, as discussed next.

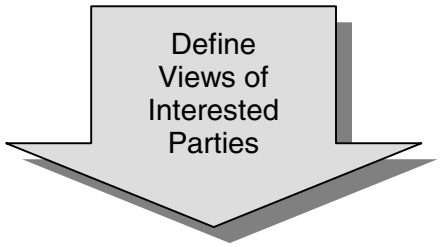
Once you understand what "rules" apply, you should **assess how your organization interacts with the environment.** This is accomplished by identifying your environmental **aspects and impacts** and determining which are significant. Some of your environmental aspects may be regulated, while other may not be.

As you identify and assess your aspects, you also should **identify specific operations and activities** from which these aspects / impacts arise. Likewise, you can identify any **monitoring** that is performed of these operations or activities for environmental purposes. For example, if you identify the generation of a particular air emission as a significant environmental aspect, it would help to know which operation(s) generate such air emissions. It might also help to know whether these air emissions are monitored or otherwise measured in some way.

Collecting this information at an early stage will help you implement subsequent EMS elements. You can use a form (such as **Figure 11**) to capture this information. One caveat -- just because you identify an existing control and/or monitoring activity related to an operation or activity, **don't assume that these controls are adequate** for EMS purposes. Their adequacy depends on several factors, including your objectives and targets.

Figure 11. **Linking Operations, Aspects, Controls and Monitoring (example)**

Source	Related Aspect(s)	Regulated?	Associated Controls	Associated Monitoring or Measurement
Operations				
Parts painting	• *Air emissions (VOCs)* • *Solvent waste generation*	• **Yes** • *Yes*	• Limits on VOC content in paints and operating hours • **SOP for HW generation**	• *Paint use records, log of operating hours* • *Waste tracking sheet*
Parts plating	• *Waste generation* • *Water discharges*	• **Yes** • *Yes*		
Other Activities				
Raw material storage	• *Potential spills*	• *Yes*	• *Stormwater Pollution Prevention Plan*	• *Weekly inspections of area*
Fleet maintenance	• **Waste oil generation** • *Potential spills*	• *Yes* • *Yes*	• **SOP for HW generation** • *Stormwater Pollution Prevention Plan*	• *Waste tracking sheet* • *Weekly inspections of area*
Products				
Pumps	• *Energy Use* • *Chromium content*	• **No** • *No*	• *None* • *None*	• *None* • *None*
Services				
Equipment servicing at customer sites	• *Waste generation* • *Fuel use*	• *No* • *No*	• *SOP for equipment service* • *None*	• *Waste tracking sheet* • *Fuel dispensing records*

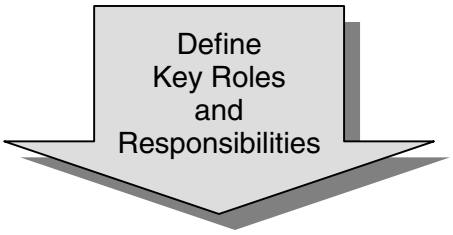


Armed with information on applicable legal and other requirements as well as the environmental attributes of your products, activities and services, you should **gather information of the views of your "stakeholders"** (or interested parties). Stakeholders might include, for example, your neighbors, interest groups, regulators and others. Their views might address how your organization affects the environment, how well you are meeting your environmental obligations, and whether your organization is a "good neighbor", among other topics. There are many ways to collect information on stakeholder views, as discussed in Section 4 (See "Communication").

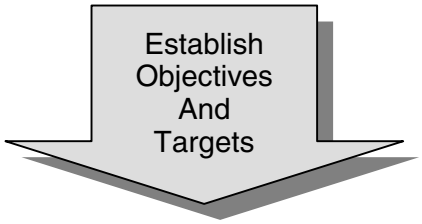
Gathering this information now allows you to consider stakeholder input in the development of your environmental policy. Since you have already assessed your legal and other requirements and your environmental aspects, you should be in a good position to have meaningful dialogues with these stakeholders.

At this point, you should have a sound basis for **developing** (or possible amending) **your environmental policy**. Using the information developed in the previous three steps will allow your organization to prepare a policy that is relevant to the organization and the key issues that it faces. You will have information on the views of your stakeholders that might be valuable in developing an environmental policy.

Keep in mind that you also evaluated your current environmental programs when you performed the preliminary review (see Section 3), so you should understand how (and how well) you are managing these key issues.

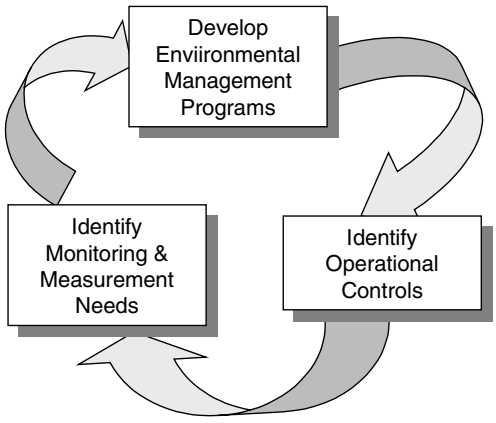


Once the environmental policy has been drafted, you can begin to **define key roles and responsibilities** within the EMS. At this stage of implementation, focus on "higher-level" responsibilities, such as the roles and responsibilities of senior management, key functional leaders and environmental staff (if one exists). Other EMS responsibilities for specific jobs or functions will be identified in a later step. Once the key roles and responsibilities have been defined, obtain the input of these individuals in the next step of the process – establishing objectives and targets.



Now you are ready to begin the process of **establishing environmental objectives and targets** for your organization. These objectives should be consistent with your environmental policy. Each of your objectives also should reflect the analyses you carried out on legal and other requirements, environmental aspects and impacts, and the views of interested parties (as well as the other factors discussed in Section 4).

You identified the operations and activities related to your significant aspects and impacts in an earlier step. Also, you defined certain key roles and responsibilities. This information will help you to determine the **relevant levels and functions** within the organization for achieving objectives and targets. For example, if you set an objective to reduce hazardous waste generation by 10% this year, which parts of the organization must be involved in order for the organization to meet this objective?

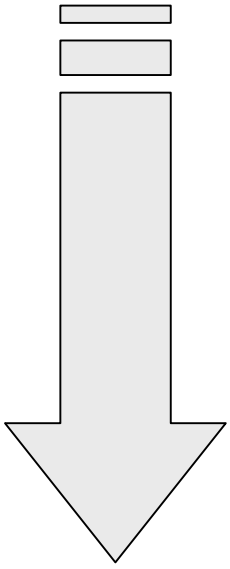


This brings us to one of the most challenging (and potentially most valuable) steps in the overall process. Once you understand your legal requirements, your significant environmental aspects and impacts, and your objectives and targets, your are ready to **tackle several EMS elements simultaneously**. These elements include the design of environmental **management programs**, the initial identification of necessary **operational controls**, and the initial identification of **monitoring and measurement** needs. One reason combining these steps is that they can often overlap significantly. For example, your environmental management program for achieving a certain objective (such as maintaining compliance) might consist of a number of existing operational controls (procedures) and monitoring activities. Similarly, achieving an objective might require a feasibility study or the implementation of certain “new” operational controls. Likewise, determining progress on achieving objectives often requires some form of monitoring or measurement.

An example of a form for describing environmental management programs that shows the links between programs and operational controls is provided in the Tool Kit (Appendix A)

One important caveat: Keep in mind that operational controls and monitoring / measurement processes are often needed **even if** there is no objective (or corresponding management program) for a particular operation or activity. For example, controls might be needed for certain operations to ensure compliance with legal requirements or to control a significant environmental aspect, even where no specific objective has been set. The initial identification of operational control needs at this point in the process must be supplemented by the more detailed design of operational controls and monitoring processes, as described in a subsequent process step.

Also keep in mind that this **process is usually iterative.** That is, you might need to "re-visit" your management programs, operational controls and monitoring processes over time to ensure they are consistent and up-to-date.

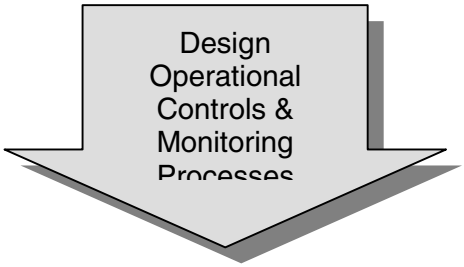


You should already have a **head start** on this step, since you identified the operations and activities related to your significant environmental aspects (as well as existing control and monitoring processes several steps ago. *Remember how we said this was a good idea?*

Your don't need to fully develop these operational controls and monitoring activities yet – that step comes later (see "Design Operational Controls & Monitoring Processes"). What you need to do now is **compile a list of your operational control and monitoring needs**. As you develop your environmental management programs, ask yourself the following questions:

- How do we control this operation or activity now?
- Are these controls adequate to meet our objectives and to ensure compliance?
- If additional controls are needed, what types of controls?
- What type of monitoring / measurement is needed to track our progress in achieving objectives and to ensure that operational controls are implemented as designed?

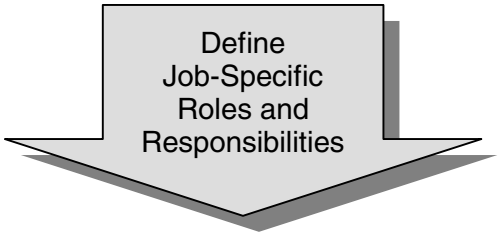
At this stage of implementation, your EMS will begin to generate some documents (such as procedures and forms) and records (that demonstrate that various processes are being carried out). For this reason, it is a good time to **establish procedures for corrective/preventive action, document control, and records management**. These three processes are essentially "system maintenance" functions. As you develop and implement other system-level procedures, work instructions for various activities, and other EMS documents, you need a process for controlling the generation and modification of these documents. Likewise, you will need a process to ensure that you can fix (or correct) problems when they occur. In addition, many of these processes (such as monitoring activities) generate records, so you need an effective way to manage the records your EMS generates.



Once the system maintenance functions in place, you can start in earnest the **development of activity- or area-specific operational controls and monitoring processes**. As a starting point, refer back to the list of operational control and monitoring needs that was generated in preparing your environmental management programs (see earlier step). Also, you should have a template for the development of these work instructions (or SOP's), since a document control process was established in the previous step. Remember that you might need operational controls and monitoring processes to meet your **policy commitments** and **control significant environmental aspects**, even where no specific objectives or environmental management programs have been established.

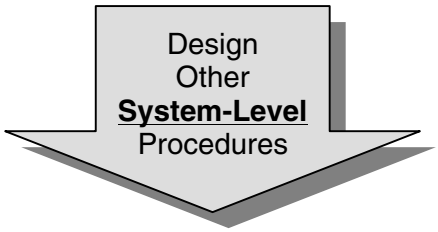
Employees that work in relevant operations or activities can provide a lot of support here. Also, note that these operational controls and monitoring processes can play an important role in employee training, as discussed later.

Also keep in mind that you also need a procedure for conducting **periodic compliance evaluations**.



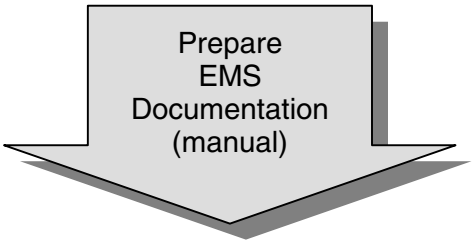
As part of the process described above, you should **define job-specific roles and responsibilities**. Such roles and responsibilities should address the specific operational controls and monitoring processes discussed above. You might want to document these responsibilities in a **responsibility matrix** or in some other form that is easily communicated to employees.

Initial employee awareness training should be conducted to promote understanding of the organization's EMS efforts and progress made to-date. As a first step, train employees on the environmental policy and other elements of the EMS. Discuss the environmental impacts of their activities, any new / modified procedures, the organization's objectives and targets, as well as their EMS responsibilities. If you have contractors or others at your site who are not employees of your organization, consider whether these other individuals should be included in these awareness sessions.



Some system-level procedures (such as the procedures for identification of environmental aspects and access to legal and other requirements) were developed at earlier stages of the process. At this point, you **can develop any other procedures required for the EMS**. These other system-level procedures might include, for example:

- employee training and awareness,
- internal and external communication,
- emergency preparedness and response,
- EMS auditing, and
- management review.

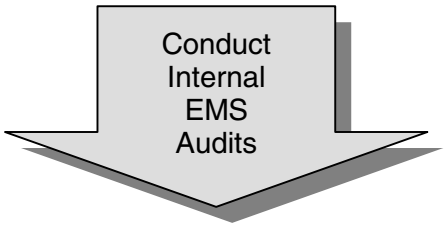


Once you have established roles and responsibilities and defined all of your system-level procedures, **preparing the EMS manual** should be a relatively simple matter. The manual should summarize the results of your efforts so far (that is, it should describe the processes you have developed, the roles and responsibilities you have defined as well as other EMS elements). Also, it is important to describe the **links** among system elements and provide direction to other system documents. Keep the manual simple – there is no need to provide great detail on any particular system process. Readers can be referred to the detailed procedures if more information is needed.

Once the procedures and other system documentation have been prepared, you are ready to **conduct specific employee EMS training**. As a first step, identify specific **training needs**. Employee training should be designed to ensure understanding of:

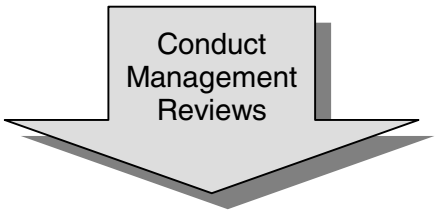
- key system processes,
- operational controls related to their specific jobs, and
- any monitoring or measurement for which they are responsible.

Job-specific training should also cover topics such as EMS auditing (for employees that will conduct internal EMS audits.)



Once internal auditors have been selected and trained, you should **design and initiate the internal auditing process**. At this point, you should have sufficient EMS processes in place to conduct meaningful audits. Many organizations find that it is easier to start with smaller, more frequent audits that to audit the entire EMS at once. These early audits can serve as a learning tool for the auditors.

Once the audit results are known, use **the corrective and preventive action process** you developed earlier to address any identified problems. Audit records should be managed in accordance with the records management process.



Use the results of your internal audits (along with other information on the EMS) to **conduct management reviews**. Management should consider the need for any changes to the EMS and make assignments for any changes needed. Such assignments should be consistent with the roles and responsibilities established previously.

Appendix A: TOOL KIT

Sample Environmental Policies

NEO INDUSTRIES
HEALTH, SAFETY AND ENVIRONMENTAL POLICY

Neo Industries is committed to managing health, safety and environmental (HS&E) matters as an integral part of our business. In particular, it is our policy to assure the HS&E integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:

Compliance

We will comply with all applicable laws and regulations and will implement programs and procedures to assure compliance. Strict compliance with HS&E standards will be a key ingredient in the training, performance reviews and incentives of all employees.

Where existing laws and regulations are not adequate to assure protection of human health, safety and the environment, we will establish and meet our own HS&E quality standards.

Prevention

We will employ management systems and procedures specifically designed to prevent activities and / or conditions that pose a threat to human health, safety or the environment. We will minimize risk and protect our employees and the communities in which we operate by employing safe technologies and operating procedures, as well as being prepared for emergencies.

We will strive to prevent releases to the atmosphere, land or water. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.

Communication

We will communicate our commitment to HS&E quality to our employees, vendors and customers. We will solicit their input in meeting our HS&E goals and in turn will offer assistance to meet their goals.

Continuous Improvement

We will continuously seek opportunities to improve our adherence to these principles, and will periodically report progress to our stakeholders.

{Signature}
Neil K. Holt
President

March 1995

Environmental Quality Policy Statement

PG&E is committed to a clean, healthy environment. We will provide our customers with safe, reliable, and responsive utility service in an environmentally sensitive and responsible manner. We believe that sound environmental policy contributes to our competitive strength and benefits our customers, shareholders, and employees by contributing to the overall well-being and economic health of the communities we serve.

September 1995

(Actual policy is printed on recycled paper)

We will:

Comply fully with the letter and spirit of environmental laws and regulations, and strive to secure fundamental reforms that will improve their environmental effectiveness and reduce the cost of compliance.

Consider environmental factors and the full acquisition, use, and disposal costs when making planning, purchasing, and operating decisions.

Work continuously to improve the effectiveness of our environmental management.

Provide appropriate environmental training and educate employees to be environmentally responsible on the job and at home.

Monitor our environmental performance regularly through rigorous evaluations.

Seek to prevent pollution before it is produced, reduce the amount of waste at our facilities, and support pollution prevention by our customers and suppliers.

Manage land, water, wildlife, and timber resources in an environmentally sensitive manner.

Use energy efficiently throughout our operations, and support the efficient use of gas and electricity by our customers and suppliers.

Re-use and recycle whenever possible.

Use environmentally preferred materials.

Clean up residual pollution from past operations in a cost-effective manner.

Work cooperatively with others to further common environmental objectives.

Communicate and reinforce this policy throughout the company.

EMS Addendum

Statement of Corporate Environmental Policy

Milan Screw Products Inc. is committed to continual improvement of its Environmental Management System (EMS), which includes waste minimization, the prevention of pollution, and compliance with all relevant federal, state, and local environmental legislation and regulations. The company will meet or exceed the environmental requirements of other organizations to which Milan Screw Products subscribes. To sustain this commitment, the requirements of the Environmental Management System described in this Manual apply to all activities, equipment, material and employees.

The company's Environmental Compliance Officer is the company's EMS Management Representative who has the responsibility and authority to plan, enforce, and maintain the company's Environmental Management System. This responsibility also includes stoppage of activities that deviate from the requirements of this Manual. The Environmental Compliance Officer, with the assistance of the Environmental Task Group, will propose annual targets and objectives to be approved by the Management Review Board.

The EMS Management Representative may delegate some of this authority downward through the organization in order to effectively implement the system.

Charles Tellas
President and CEO

December 10, 1995

Descriptions of Environmental Aspect Identification Techniques

SOME DATA SOURCES FOR IDENTIFYING AND EVALUATING ENVIRONMENTAL IMPACTS

Process Hazard Analyses	Used to identify and assess potential impacts associated with unplanned releases of hazardous materials. Methods in common use due to OSHA Process Safety Management regulations. Typically employs team approach to identify and rank hazards.
Emission Inventories	Used to quantify emissions of pollutants to the air. Some data may already by available to the organization, based on EPCRA requirements and CAA Title V permitting program.
Environmental Impact Assessments	Used to satisfy requirements of National Environmental Policy Act (NEPA) regarding the evaluation of environmental impacts associated with proposed projects. Methodology is in common use, but is not typically used to assess environmental impacts associated with existing operations.
Life Cycle Assessments	Used to assess full range of impacts from products, from raw material procurement through product disposal. Emerging methods somewhat subjective and can be resource intensive. Methods are described in ISO 14000 standards (ISO 14040-14048).
Design for Environment Studies	Used to incorporate environmental considerations into product design. See **Appendix C** for additional details.
Pollution Prevention or Waste Minimization Audits	Used to identify opportunities to reduce or eliminate pollution at the source and to identify recycling options. Requires fairly rigorous assessment of facility operations. Typically does not examine off-site impacts.
Environmental Property Assessments	Used to assess potential environmental liabilities associated with facility or business acquisitions or divestitures. Scope and level of detail is variable. Typically does not assess impacts associated with products or services.
Risk Assessments	Used to assess potential health and/or environment risks typically associated with chemical exposure. Variety of qualitative and quantitative methods in common use.
Environmental Cost Accounting	Used to assess full environmental costs associated with activities and/or products. Emerging protocols require comprehensive assessment to quantify costs.
Environmental Compliance Audits	Used to assess compliance with federal, state and local environmental regulations. Methods in common use. Scope and detail vary, but typically not directed at examining environmental impacts (particularly for products).
Project Safety / Hazard Reviews	Used to assess and mitigate potential safety hazards associated with new or modified projects. Methods in common use, but do not typically focus on environmental issues.

Sample Procedure:
Environmental Aspects Identification

EMS Procedure: Environmental Aspects Identification

I. Purpose

To identify the environmental aspects of the organization's activities, products and services in order to determine those which may have a significant impact on the environment.

II. Scope

This procedure covers all activities, services and products of the organization. For purposes of evaluation, activities, services and products with similar characteristics may be grouped.

A baseline evaluation will be conducted of existing products, activities, and services. The need for follow-up evaluations is determined based on changes in evaluation methodology or significant changes in the organization's mission, products, or processes.

III. Definitions

Environmental aspects- Components of the organization's activities, products and services that are likely to interact with the environment.

Environmental impact- Any change to the environment, whether adverse of beneficial, wholly or partially resulting from the activities, products and services of the organization.

IV. General

This procedure covers those environmental aspects of activities, products and services that the organization can control or over which it can be expected to have an influence. Significant environmental aspects identified through this process are considered in the setting of environmental objectives and targets.

The procedure consists of an initial screening of activities, products and services, based on available data by a cross-functional team of organization personnel. The cross-functional team assesses the environmental aspects, determines which of these might result in significant impacts, then sets priorities for further analysis, as needed.

The Company reviews the information developed during the evaluation on a regular basis to ensure that it is up-to-date.

V. Procedure

A. The environmental manager assembles a cross-functional team to perform the evaluation. The team may include representatives from environmental, health & safety, product design, engineering, line management, maintenance, and shipping / receiving, or other functions as appropriate. Separate teams may be formed to evaluate particular groups of products, activities and services. The team may call upon other individuals in the organization, as needed.

B. The team considers each of the stages in the life cycle of the organization's products, services and activities, including (where appropriate):

- pre-production or service strategy (design, procurement, etc.),
- manufacturing,
- production/distribution,
- use / service, and
- disposal / waste management.

Each product, service or activity is evaluated for environmental impacts in each of these areas; however, products, services or activities may be "grouped" such that those with similar characteristics can be evaluated concurrently. The team rates the product, service or activity (or groups of same) against the factors shown on Table 1 to identify those that may result in significant impacts.

C. For purposes of this evaluation, "activities" are those activities that are not directly linked to a specific product, service or activity (such as equipment maintenance). Activities that are directly linked to the manufacture of a particular product are evaluated when that product is evaluated.

D. Results of team findings are documented. If the team determines that additional information is needed to evaluate a particular product or activity, the Team Leader assigns the responsibility for collecting that information to an appropriate team member.

E. The environmental manager is responsible for working with plant management to ensure that significant environmental aspects identified by the team are considered in setting environmental objectives and targets for the site. (See Procedure #).

F. The results of the most recent environmental aspect / impact identification are reviewed as part of the Management Review process (See Procedure #). Based on this review, the organization's management determines the need to update the environmental impact evaluation. Factors such as improved assessment methodologies, or major changes to the organization's mission, products, and processes are considered in determining the need to update the assessment.

TABLE 1. SCORING GUIDE FOR ENVIRONMENTAL ASPECTS EVALUATION

For each product, service or activity (or group of products, services or activities), each element in the table will be assigned two scores:

Degree of Impact
4 = serious (likely to result in severe or widespread damage to human health or the environment)
3 = moderate
2 = minor
1 = no impact (unlikely to have an adverse impact on human health or the environment)

Frequency of Impact
4 = continuous (impact occurs on an on-going basis)
3 = frequent (impact occurs more than once / month)
2 = infrequent (impact occurs more than once / year, less than once / month)
1 = improbable / never (impact has never occurred or is highly unlikely)

Category	Indicator	Pre-Production	Manufacturing	Production/ Distribution	Use / Service	Waste Mgt
Human Health						
	Employees					
	Surrounding Community					
	Global					
Environment						
	Air Quality					
	Surface Water					
	Ground Water					
	Land / Soil					
	Ecosystem Effects					
	Noise					
Resource Use						
	Fuels					
	Water					
	Raw Materials					

Resources for Tracking Environmental Laws and Regulations

Resources for Tracking Environmental Laws and Regulations

Over the last few years, the Internet has become a tremendous tool for tracking and obtaining information on environmental laws and regulations. The USEPA's home page (see address below) in one useful Internet source.

This table describes a variety of commercial and non-commercial sources of information on federal and state environmental laws and regulations. This list is not intended to be comprehensive. Appearance on this list should not be construed as an endorsement by EPA or NSF of any commercial products listed here.

Source	Description
USEPA (Small Business Ombudsman) 1-800-368-5888	Regulatory explanations and guidance, research, case studies, contacts for additional information. Variety of hotlines available for particular statutes (such as RCRA). Internet access also available (http://www.epa.gov)
Small Business Assistance Programs (various states)	Guidance on regulations and compliance issues. Initially focused on clean Air Act requirements, but expanding into other environmental media.
US Small Business Administration	Various services available to small businesses in the US.
US Government Printing Office 202-512-1800	Federal Register published daily with all federal proposed and final rules. (Also available on line via *GPO Access)*
Trade and Professional Associations (various)	Provide a variety of services related to environmental laws and regulations, including regulatory updates and training. Contact individual associations for details.
Counterpoint Publishing 1-800-998-4515	CD-ROM and Internet dial-up access to legal / regulatory information for federal government and all 50 states, updated daily.
Bureau of National Affairs 1-800-372-1033	Information on EHS laws, regulations and activities at international, national, and state level. Paper and electronic access available.
Thompson Publishing Group 1-800-677-3789	Manuals on a variety of federal and state environmental programs with monthly updates and newsletters.
Business & Legal Reports, Inc. 1-800-727-5257	Access to federal and state regulations with monthly, updates on available on CD-ROM.
Aspen Law and Business 1-800-638-8437	Publishes compliance manuals with regular update service for RCRA and Clean Air Act.

Sample Procedure: Tracking Environmental Laws and Regulations

EMS PROCEDURE: REGULATORY TRACKING AND ANALYSIS

I. Purpose

To ensure that the organization identifies, has access to, and evaluates laws, regulations, and internal organizational requirements that apply to the environmental aspects of its activities, products, and services.

II. Scope

This procedure covers laws, regulations, and other requirements established at the federal, state, and local level that apply to the environmental aspects of the organization's activities, services and products. The organization takes these requirements into account when setting its environmental objectives, as discussed in Procedure #.

III. Definitions

Applicable laws and regulations- Legal requirements promulgated by federal, state or local government authorities that apply to environmental aspects of the organization's products, activities or services.

IV. Procedure

A. The environmental manager is responsible for tracking applicable laws and regulations, identifying those related to the organization 's activities, products and services. The environmental manager is also responsible for evaluating the potential impacts of these laws and regulations on the organization and its products, activities and services.

B. The environmental manager employs a variety of techniques and information sources to track, identify and evaluate applicable laws and regulations. These include, but are not limited to: commercial services / databases; information provided by its trade association; communications with federal and state regulatory agencies; company environmental meetings; and periodic environmental refresher training. The environmental manager monitors these information sources on a regular basis to ensure that new issues are identified on a timely basis.

C. As necessary, "off-site" resources (such as consultants and attorneys) may be called upon to assist the environmental manager in evaluating applicable laws and regulations or in developing programs in response to applicable laws and regulations. Where off-site resources are used in this manner, the organization's environmental manager coordinates such efforts.

IV. Procedure (cont'd.)

D. The environmental manager disseminates information on applicable laws and regulations (and their potential impacts on the organization's activities, products and services) to appropriate personnel. The determination of which organization personnel must be informed and the method for providing this information is at the discretion of the environmental manager, based on the circumstances of the case.

E. The environmental manager compiles and maintains copies of significant applicable environmental laws and regulations. Where copies of such laws and regulations are not maintained at the organization's offices, the environmental manager ensures that ready access is available from other sources, such as those listed above.

F. If site audits indicate that additional laws and regulations must be tracked and evaluated, the environmental manager ensures that these activities take place.

Process Tool:
Setting Objectives & Targets

Process Tool: Setting Objectives and Targets

Step 1: A **cross-functional team** is a good way for your organization to set realistic objectives and targets. **List here** who needs to be involved on the team:

Name	Contacted?
•	•
•	•
•	•
•	•
•	•
•	•

Step 2: Think about what **information sources** your team will need to establish objectives and targets. Pull together information sources such as:

Information Sources	How they will help **e.g.,**
• process maps • waste, and emission data • site maps • compliance audit reports • descriptions of identified environmental aspects • communications from interested parties • others?? • • *(you may also want to do a plant tour or "walk through" to identify other issues)*	• *identify process steps with environmental aspects* • *determine current wastes and sources* • *etc.*

Step 3: Is there other information that might be helpful to the team?

Other Information Needed	Where we will get it
•	•
•	•
•	•

Step 4: **List the significant environmental impacts** (you identified these earlier). **Categorize** these impacts by type:

Energy Use	Raw Materials	Air Impacts	Water Impacts	Waste Impacts	Land Issues	Other (specify)

Step 5: Look at **processes** (such as plating or assembly) and **activities** (such as shipping or purchasing). Are there any **other issues** the team should consider, in addition to those listed above as significant impacts? (For example, you might want to establish an objective to reduce spills of hazardous materials at the loading dock, even if this was not identified as a potentially significant environmental impact.)

Process or activity	Issues	Possible Objectives & Targets

Step 6: List any new **regulatory requirements** that affect the facility (or other regulations for which the need for additional actions has been identified).

Regulations, other requirements	Possible Objectives & Targets

Step 7: List communications with **interested parties.** Any need for additional objectives related to views of neighbors, community groups or other parties?

Communications With Interested Parties	Possible Objectives & Targets

Step 8: Look at the lists of **possible objectives developed in Steps 4 -7**. **Brainstorm** with the team on whether these objectives are:

- reasonable
- technologically feasible
- consistent with the business plan
- affordable.

List preliminary objectives and targets based on this exercise:

Selected Preliminary Objectives
•
•
•
•
•

Step 9: Determine how you will **measure** each of the selected preliminary objectives. (If you cannot establish an effective way to measure it, put that objective "on-hold" for later consideration).

Selected Objectives	**Performance Indicator(s)**

Step 10: For each objectives that you selected, determine **who** is going to develop the **action plan** (who, what , when, where, how). List these names below:

Selected Objectives	**Responsibility for Action Plan**

Sample Procedure: Setting Objectives & Targets

EMS PROCEDURE: SETTING AND TRACKING OF ENVIRONMENTAL OBJECTIVES AND TARGETS

I. Purpose

The purpose of this procedure is to ensure that the organization establishes and maintains documented environmental objectives and targets.

II Scope

This procedure applies to environmental objectives and targets set at all relevant levels within the organization.

III. Definitions

Environmental (or environmental) objective- A site goal that is consistent with the environmental policies and considers significant environmental impacts and applicable laws and regulations. Objectives are quantified wherever practicable.

Environmental (environmental) target- A detailed performance requirement (quantified wherever practicable) based on an environmental objective. A target should be met in order for the underlying objective to be achieved.

IV. General

The organization establishes environmental objectives and targets in order to implement the environmental policies. Objectives and targets also provide a means for the organization to measure the effectiveness of its environmental efforts and improve the performance of the environmental management system. In establishing environmental objectives, the organization considers:

- applicable laws and regulations (and requirements of other programs, such as ...);
- environmental aspects of the organization's activities and products;
- technological, financial, operational, and other business requirements; and,
- the views of employees and other interested parties.

Based on the organization 's environmental objectives, targets are established for different functions within the organization and for different areas of the plant. For example, the organization may establish an environmental objective to "reduce waste generation by 10% per year". Based on this objective, different areas of the plant might set targets for reducing individual waste streams in order to ensure that the organization's objective was achieved. An organization-wide environmental objective might also be translated into individual projects (such as

changes in production processes, materials or pollution control equipment) in different plant areas.

V. Procedure

A. The organization's top management is responsible for establishing environmental objectives on an annual basis. To initiate the process, the Plant Manager holds a meeting of all staff members to discuss the development of environmental objectives.

B. Objectives are action- and prevention-oriented and are intended to result in meaningful improvements in the organization 's environmental performance.

C. Each plant area or functional manager is responsible for providing input from his / her own function (Finance, Engineering, etc.) or shop area (Fabrication, Assembly, Shipping / Receiving, etc.). The organization's environmental manager is responsible for providing input on applicable laws and regulations, significant site environmental impacts, and the views of interested parties. (These inputs are obtained from the separate analyses required by Procedure #'s).

D. As a starting point, the organization's management evaluates its performance against environmental objectives for the current year. As part of this effort, management examines the results of its environmental performance evaluations.

E. Preliminary environmental objectives are developed for further discussion and evaluation. Each manager is responsible for evaluating the potential impacts within his / her functional or shop area (if any) of the proposed environmental objectives. The organization's environmental manager reviews proposed objectives to ensure consistency with the overall environmental policy.

F. Environmental objectives are finalized, based on review comments from site managers and employees. Each manager identifies the impacts of the objectives in his / her function or shop area, establishes targets to achieve the objectives, and develops appropriate measures to track progress towards meeting the objectives and targets.

G. Each manager is responsible for communicating objectives and targets (and the means for achieving them) to others in his / her part of the organization.

H. Progress towards the objectives and targets is reviewed on a regular basis at management meetings. The progress is also communicated to plant employees via bulletin boards and other similar means.

I. At the end of each calendar year, the organization's management reviews its performance with regard to achieving the objectives and targets. This information is used as input to setting objectives and targets for the succeeding year.

Sample Tools: Environmental Management Program

Environmental Management Program — Sample Tool

Objective / Target #1: _____					
Action Items	**Priority**	**Respon-sibilities**	**Schedule**	**Resources Needed**	**Comments**

Sample Responsibility Matrix

Responsibility Matrix

Legend:
L = Lead Role
S = Supporting Role

	Plant M'gr	EHS M'gr	HR M'gr	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mg't Rep.	Employees
Communicate importance of environmental management	L	S					S			
Coordinate auditing efforts		L		S			S			
Track / analyze new regulations (and maintain library)		L								
Obtain permits and develop compliance plans		L				S				
Prepare reports required by regulations		L								
Coordinate communications with interested parties			L							
Train employees		S					L			
Integrate environmental into recruiting practices			L							
Integrate environmental into performance appraisal process			L							
Communicate with contractors on environmental expectations					L					
Comply with applicable regulatory requirements	L	L	S	S	S	S	S	S	S	S
Conform with organization's EMS requirements	L	L	S	S	S	S	S	S	S	S
Maintain equipment / tools to control environmental impact				L						
Monitor key processes		S					L			
Coordinate emergency response efforts	L	S								
Identify environmental aspects of products, activities, or services	S	L	S	S	S	S	S	S	S	
Establish environmental objectives and targets	L	S					S			
Develop budget for environmental management		S						L		
Maintain EMS records (training, etc.)		L								
Coordinate EMS document control efforts					S				L	

Responsibility Matrix

Legend:
L = Lead Role
S = Supporting Role

	Plant M'gr	EHS M'gr	HR M'gr	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mg't Rep.	Employees
Communicate importance of environmental management										
Coordinate auditing efforts										
Track / analyze new regulations (and maintain library)										
Obtain permits and develop compliance plans										
Prepare reports required by regulations										
Coordinate communications with interested parties										
Train employees										
Integrate environmental into recruiting practices										
Integrate environmental into performance appraisal process										
Communicate with contractors on environmental expectations										
Comply with applicable regulatory requirements										
Conform with organization's EMS requirements										
Maintain equipment / tools to control environmental impact										
Monitor key processes										
Coordinate emergency response efforts										
Identify environmental aspects of products, activities, or services										
Establish environmental objectives and targets										
Develop budget for environmental management										
Maintain EMS records (training, etc.)										
Coordinate EMS document control efforts										

Sample Environmental Training Log

EMS Training Log (Sample)

Training Topic	Attendees*	Frequency	Course Length	Course Method	Comments	Date Completed
EMS Awareness						
Supervisor EHS Training						
Hazardous Waste Management						
Hazardous Waste Operations						
Spill Prevention & Response						
Chemical Management						
Emergency Response						
Accident Investigation						
Hazardous Materials Transport						
Hazard Communication						
Personal Protective Equipment						
Fire Safety						
Electrical Safety						
Hearing Conservation						
Confined Space Entry						
Lock-out/Tag-out						
Bloodborne Pathogens						
Job-Specific Training (list)						

Attendees Code
1: All Employees
2: Supervisors / Managers
3: Operators
4: Maintenance
5: Material Handlers
6: Engineering

Sample Procedure:
Internal Communications

EMS PROCEDURE: INTERNAL COMMUNICATIONS

I. Purpose

The purpose of this procedure is to ensure effective and timely communication of environmentally-related information within the organization.

II. Scope

This procedure describes processes for internal communications on various elements of the organization 's environmental management system, including the environmental policy and objectives. This procedure also can be used for employee reporting of health & safety hazards, or for other related purposes.

III. General

A variety of processes are used for internal communication on environmentally-related matters. The effectiveness of these communication processes is evaluated on an on-going basis, through employee surveys, environmental training programs, organization audits and inspections, and informal discussions.

Major topics of internal communication include:

- environmental policy, objectives, and targets;
- environmental management roles and responsibilities;
- organization performance compared to environmental objectives and targets;
- environmental policies and procedures; and,
- hazards and emergency situations.

IV. Procedure

General

A. The Plant Manager is responsible for communicating the organization 's environmental policies and procedures to all employees. The Plant Manager is also responsible for communicating roles and responsibilities for environmental management.

B. Area and functional managers are responsible for communicating environmental targets (and performance vs. objectives and targets) to employees in their areas or functions, as well as to the management team.

IV. Procedure (cont'd.)

C. Area and functional leaders are responsible for communicating environmental procedures (and any changes to the procedures), results of accident and "near miss" investigations in their areas, and other significant environmentally-related information (such as upcoming training classes).

D. The selection of the most appropriate mechanism(s) used for internal communication is left to the discretion of the responsible manager. Mechanisms that are used for various types of communications include, but are not limited to:

- "all employee" meetings,
- area environmental meetings,
- workstation procedures,
- bulletin boards and posters,
- memoranda and employee letters, and
- newsletters.

Hazard and Emergency Reporting

A. All employees are responsible for reporting environmental or health & safety hazards or emergencies (including spills and fires) immediately upon discovery. Such hazards are reported to the Area Manager. If necessary, such hazards should also be reported to the appropriate emergency contacts (as identified in the emergency response procedures {Procedure #}). The Area Manager in turn notifies the organization's environmental manager.

B. If the Area Manager is not available, employees report environmental or health & safety hazards directly to the environmental manager.

C. The organization's environmental manager maintains a log of all reported environmental or health & safety hazards. The environmental manager tracks the investigation and correction (as needed) for all reported hazards.

D. Communication of the results of investigating / correcting reported hazards is the responsibility of the appropriate Area Manager.

E. Emergency response procedures are described in Procedure #.

Sample Procedure: Communications with External Parties

EMS PROCEDURE: COMMUNICATIONS WITH EXTERNAL PARTIES

I. Purpose

This procedure is intended to establish a process for outreach and communication with external parties regarding the organization's environmental management system *(Note: the organization should also consider external communication regarding its significant environmental aspects).*

II. Scope

This procedure describes how the organization receives, documents, and responds to communications from external parties. In addition, it discusses proactive steps that the organization takes to maintain a meaningful dialogue with external parties on environmental matters.

III. Definitions

Interested Parties- Individuals or groups with an interest in the environmental impacts of the organization's products, activities or services. These parties include regulators, local residents, employees, stockholders, insurers, customers, environmental groups and the general public *(adapted from ISO 14001).*

IV. General

The organization uses a number of mechanisms to ensure effective communication with interested parties. These mechanisms include regulatory filings (such as permit applications and reports), open houses, the media, and informal discussions with regulators, community representatives, and local business leaders.

To solicit the views of interested parties, the organization may use additional techniques, including (but not limited to) surveys, community advisory panels, newsletters, or informal meetings with representatives of external groups.

General rules for external communications require that the information provided by the organization:

- be understandable and adequately explained to the recipient(s); and
- present an accurate and verifiable picture of the organization and its environmental management system, its environmental performance, or other related matters.

V. Procedure

A. Management of Communications from External Parties

1. Inquiries and other communications (received by mail, fax, telephone, or in person) from external parties concerning the organization's EMS or environmental performance may be received by a number of the organization's representatives, including the Plant Manager, the environmental manager, and the human resources manager, among others. All such communications are reviewed by the Plant Manager or his / her designee to determine the appropriate response.

2. Communication with representatives of regulatory agencies is delegated to the organization's environmental manager, who maintains records of all such communications (both incoming and outgoing). In the absence of the environmental manager, communications with regulatory officials are delegated to the human resources manager.

3. Copies of all other written communications on environmental matters are maintained by the human resources manager. All non-written communications from external parties are documented using telephone logs or similar means. All records of external communications are maintained as discussed in Procedure # (Records Management).

4. A record of the responses to all communications from external parties is maintained by the human resources manager in files designated for that purpose.

B. Outreach to Interested Parties

1. The organization solicits the views of interested parties on its environmental management system, its environmental performance, and other related matters. In particular, such outreach is conducted when significant changes at the facility are being considered, such as facility expansion or other actions that might affect the actual or potential environmental impacts of the organization's products, activities, or services.

2. As part of the Management Review process, the team designated to conduct the Review evaluates proactive efforts to communicate with external parties. Based on this evaluation and other factors, the organization's management determines the need for outreach with external parties in the coming year and how such communications can be carried out most effectively.

External Hazard and Emergency Communication

Note: All external communication regarding emergency response are addressed in Procedure #.

Sample Document Index

Sample Document Index

(sample indicates individual that revised document, his/her position/department, and date(s) of revision)

Revision Number

Document	1	2	3	4	5	6
Environmental Policy	*John Smith Plant Manager 1/1/98*	*John Smith Plant Manager 1/1/99*				
Environmental Manual						
Procedure 1: Environmental Aspects Identification						
Procedure 2: Access to Laws and Regulations						
Procedure 3: Setting Objectives & Targets						
Procedure 4: Environmental Training						
Procedure 5: External Communications						
Procedure 6: Internal Communications						
Procedure 7: Document Control						
Procedure 8: Emergency Preparedness						
Procedure 9: Corrective Action						
Procedure 10: Records Management						
Procedure 11: EMS Audits						
Procedure 12: Management Reviews						
Procedures 13-X (list individually)						
EMS Audit Checklist						
Other plans & documents related to above procedures (list separately , e.g. SPCC Plan, Emergency Response Plan, etc.).						
Other forms and checklists (list)						

Outline of Sample EMS Manual, Other Documents

Outline of Sample EMS Manual, Other Documents

Basic EMS Manual

- **Index / Revision History / Distribution List**
- **Environmental Policy**
- **Description of How Our EMS Addresses Each of the EMS Elements**
  - How We Identify Significant Environmental Aspects
  - How We Access and Analyze Legal and Other Requirements
  - How We Establish and Maintain Objectives and Targets
  - How the Organizational Structure Supports EMS (organization charts, key responsibilities)
  - How We Train our Employees and Ensure Competence
  - How We Communicate (internally and externally)
  - How We Control EMS Documents
  - How We Identify Key Processes and Develop Controls for them
  - How We Prepare for and Respond to Emergencies
  - How We Monitor Key Characteristics of Operations and Activities
  - How We Identify, Investigate and Correct Nonconformance
  - etc.

Environmental Management Program Description

- **Annual Objectives and Targets**
- **Action Plans (to achieve objectives and targets)**
- **Tracking and Measuring Progress**

EMS Procedures

- **Index / Revision History / Distribution List**
- **Organization-wide Procedures (in some cases, could be several procedures)**
  - Environmental Aspects Identification
  - Access to Legal and Other Requirements
  - Training, Awareness and Competence
  - Internal Communication
  - External Communication
  - Document Control
  - Change Management Process(es)
  - Management of Suppliers / Vendors
  - Emergency Preparedness and Response
  - Monitoring and Measurement
  - Calibration and Maintenance of Monitoring Equipment
  - Compliance Evaluation
  - Corrective and Preventive Action
  - Records Management
  - EMS Auditing
  - Management Review
- **Procedures / Work Instructions for Specific Operations or Activities**
  - Waste Management
  - Wastewater Treatment ***(These are examples only)***
  - Operation of the Paint Line
  - Operation of Plating Line
- **Forms, Drawings, and Checklists (that support the EMS procedures)**

Sample Procedure: Document Control

EMS PROCEDURE: CONTROL OF EMS DOCUMENTS

I. Purpose

This procedure establishes a process for the review, distribution, and implementation of documents that describe and control the EMS.

II. Scope

This procedure applies to the following documents (and any changes to them) which must be controlled:

- the environmental manual;
- facility-wide environmental procedures;
- process - or activity-specific procedures and work instructions; and
- forms, checklists, and drawings used for EMS purposes.

III. General

A. Distribution lists are maintained by the ISO Management Representative (or designee). Document distribution may be either controlled or uncontrolled.

B. Depending on the type of document, controlled copies are identified by stamp, signature, or other similar means.

C. Uncontrolled copies of documents may exist for illustrative, instructional, knowledge preservation, or external distribution purposes only.

D. All controlled documents are approved prior to issue. All controlled documents are marked with the revision number and the revision date.

E. Initial distribution of documents may be determined by the originator of the document or the ISO Management Representative.

F. Unless otherwise specified, the originator of a document is responsible for review and approval of any subsequent changes to the document.

G. The ISO Management Representative (or designee) is responsible for removal of obsolete controlled documents from all points of issue and use.

H. The ISO Management Representative (or designee) is responsible for ensuring that changes to controlled documents are understood, distributed, and communicated to the affected functions within the organization.

I. All controlled documents are listed on the EMS Document Index. The Index shows the date(s) of any revisions and the person(s) initiating the revisions.

IV. Procedure

A. Environmental Manual

1. Copies of the environmental manual are numbered sequentially. Distribution of controlled copies is the responsibility of the ISO Management Representative (or designee).

    a. Controlled copies are stamped “Controlled” with the distribution date.

    b. Uncontrolled copies can be issued by the ISO Management Representative (or designee). All uncontrolled copies are stamped “Uncontrolled - For Reference Only”.

2. A Distribution List of controlled documents is maintained by the ISO Management Representative (or designee). Each recipient initials the Distribution List to indicate his/her receipt of the Manual.

3. Each individual issued a controlled copy of the Environmental Manual is responsible for its safekeeping.

4. Uncontrolled copies of the Environmental Manual may be distributed outside the organization (for example, to customers). All uncontrolled copies are stamped “Uncontrolled - For Reference Only”.

5. The process for revising the Environmental Manual is described in Procedure #.

B. Facility-wide Procedures

1. Revision of facility-wide procedures is controlled as per Procedure # and is the responsibility of the ISO Management Representative (or designee).

2. Distribution of facility-wide environmental procedures is specified on the Distribution List.

3. The ISO Management Representative (or designee) is responsible for distributing new and revised procedures. A copy of the Distribution List is signed and dated by the ISO Management Representative, and initialed by each recipient. This copy of this list is maintained for at least one year.

4. When a new individual must be added to the controlled distribution for a procedure, the requester notifies the ISO Management Representative. The ISO Management Representative is then responsible for updating the Distribution List.

5. The ISO Management Representative is responsible for coordinating and executing the implementation of facility-wide procedures, as well as for documenting any resulting training. Evidence of such training is maintained in the employee training records.

6. Control of forms, checklists, and drawing used for EMS purposes follows the same process as described in steps B.1 through B.5 (above).

C. Process- or Activity-Specific Procedures and Work Instructions

1. Revision of process- or activity-specific procedures and work instructions is controlled as per Procedure # and is the responsibility of the ISO Management Representative (or designee).

2. Distribution of process- or activity-specific procedures and work instructions is specified on the Distribution List. Controlled copies are stamped “Controlled” with the distribution date.

3. The ISO Management Representative (or designee) is responsible for distribution of new and revised procedures and work instructions. A copy of the Distribution List is signed and dated by the ISO Management Representative, and initialed by each recipient. This copy of the list is maintained for at least one year.

4. Area or functional managers are responsible for coordinating and executing the implementation of activity- or process-specific procedures and work instructions in their areas, as well as for documenting any resulting training. Evidence of such training is maintained in the employee training records.

Sample Procedure: Corrective Action (includes tracking log)

EMS PROCEDURE: PREVENTIVE AND CORRECTIVE ACTION

I. Purpose

The purpose of this procedure is to establish and outline the process for identifying, documenting, analyzing, and implementing preventive and corrective actions.

II. Scope

Preventive or corrective actions may be initiated using this procedure for any environmental problem affecting the organization.

III. General

A. Corrective action is generally a reactive process used to address problems after they have occurred. Corrective action is initiated using the Corrective Action Notice (CAN) document as the primary vehicle for communication. Corrective action may be triggered by a variety of events, including internal audits and management reviews. Other items which might result in a CAN include neighbor complaints or results of monitoring and measurement.

B. Preventive action is generally a proactive process intended to prevent potential problems before they occur or become more severe. Preventive action is initiated using the Preventive Action Notice (PAN). Preventive action focuses on identifying negative trends and addressing them before they become significant. Events that might trigger a PAN include monitoring and measurement, trends analysis, tracking of progress on achieving objectives and targets, response to emergencies and near misses, and customer or neighbor complaints, among other events.

C. Preventive and corrective action notices are prepared, managed and tracked using the preventive and corrective action database.

D. The ISO Management Representative (or designee) is responsible for reviewing issues affecting the EMS, the application and maintenance of this procedure, and any updates to EMS documents affected by the preventive and corrective actions.

E. The ISO Management Representative is responsible for logging the PAN or CAN into the data base, and tracking and recording submission of solutions in the database. The requester and recipient of the CAN or PAN are responsible for verifying the effectiveness of the solution. The ISO Management Representative is responsible for overall tracking and reporting on preventive and corrective actions.

F. Personnel receiving PAN's and CAN's are responsible for instituting the required corrective or preventive action, reporting completion of the required action to the ISO Management Representative, and assuring sustained effectiveness.

G. Completed records of PAN's and CAN's are maintained in the database for at least two years after completion of the corrective or preventive action.

IV. Procedure

A. Issuing a CAN or PAN

1. A CAN or PAN may be requested by any employee. The employee requesting the CAN or PAN is responsible for bringing the problem to the attention of the ISO Management Representative. The ISO Management Representative is responsible for determining whether a CAN or PAN is appropriate and enters the appropriate information into the corrective and preventive action database. Responsibility for resolving the problem is assigned to a specific individual ("the recipient").

2. The ISO Management Representative, working with the recipient, determines an appropriate due date for resolving the CAN or PAN.

B. Determining and Implementing Corrective and Preventive Actions

1. The CAN or PAN is issued to the recipient, who is responsible for investigation and resolution of the problem. The recipient is also responsible for communicating the corrective or preventive action taken.

2. If the recipient cannot resolve the problem by the specified due date, he / she is responsible for determining an acceptable alternate due date with the ISO Management Representative.

C. Tracking CAN's and PAN's

1. CAN's or PAN's whose resolution dates are overdue appear on the Overdue Solutions report. The ISO Management Representative is responsible for issuing this report on a weekly basis to the Plant Manager and the recipients of any overdue CANs or PANs.

2. Records of PANs and CANs are maintained in the database for at least two years after completion of the corrective or preventive action.

D. Tracking Effectiveness of Solutions

1. The recipient of a CAN or PAN, in conjunction with the requester, are responsible for verifying the effectiveness of the solution. If the solution is deemed not effective, the CAN or PAN will be reissued to the original recipient.

SAMPLE CORRECTIVE ACTION NOTICE

CAN Number: Issue Date: Solution Due Date:

Name Location Phone:

Requested By:
Issued To:

Problem Statement (completed by ISO Management Representative):

Most Likely Causes (completed by ISO Management Representative):

Implemented Solutions (completed by recipient - include dates as applicable):

Results (confirming effectiveness):

Closed by: Closing Date:

CORRECTIVE ACTION TRACKING LOG

CAN Number	Requested By	Issued To	Solution Due (Date)	Solution Identified (Date)	Solution Completed (Date)	Effectiveness Verified (Date)	CAN Closed (Date)

Sample Environmental Records Organizer

Environmental Records Organizer (SAMPLE)

Air Emissions Regulations

Air Emissions Fees

Air Emissions Inventories

Air Emissions Permits

Air Permit Applications

Air Permit(s): Historical

Annual Licenses & Fees

Compliance Reporting

Compliance Plans

Community Right-to-Know

EPCRA Regulations

EPCRA Reporting

Hazardous Waste Regulations

Hazardous Waste Permit/ID Number

Hazardous Waste Fees

Hazardous Waste Biennial Report

Hazardous Waste: Open Manifests

Hazardous Waste: Closed Manifests

Historical Data

Indoor Air Quality

Loss Prevention Information

Other Permits & Permit Applications

Pollution Prevention (P2) Regulations

Pollution Prevention Fees

Pollution Prevention Reporting

Recycling Information

Recycling Projects

Special Wastes

Solid Waste Permit

Solid Waste Fees

Spill Reports

Spill Response Actions

Stormwater Regulations

Stormwater Permit

VOC/HAPs Reporting

VOC Annual Analysis

Wastewater Regulations

Wastewater Fees

Wastewater Permit

Wastewater: Semi-Annual Reporting

Sample Procedure: EMS Audits

EMS Procedure: Environmental Management System Audits

I. Purpose

To define the process for conducting periodic audits of the environmental management system (EMS). The procedure defines the process for scheduling, conducting, and reporting of EMS audits.

II. Scope

This procedure applies to all internal EMS audits conducted at the site.

The scope of EMS audits may cover all activities and processes comprising the EMS or selected elements thereof.

III. General

Internal EMS audits help to ensure the proper implementation and maintenance of the EMS by verifying that activities conform with documented procedures and that corrective actions are undertaken and are effective.

All audits are conducted by trained auditors. Auditor training is defined by Procedure #. Records of auditor training are maintained in accordance with Procedure #.

When a candidate for EMS auditor is assigned to an audit team, the Lead Auditor will prepare an evaluation of the candidate auditor's performance following the audit.

The ISO Management Representative is responsible for maintaining EMS audit records, including a list of trained auditors, auditor training records, audit schedules and protocols, and audit reports.

EMS audits are scheduled to ensure that all EMS elements and plant functions are audited at least once each year.

The ISO Management Representative is responsible for notifying EMS auditors of any upcoming audits a reasonable time prior to the scheduled audit date. Plant areas and functions subject to the EMS audit will also be notified a reasonable time prior to the audit.

The Lead Auditor is responsible for ensuring that the audit, audit report and any feedback to the plant areas or functions covered by the audit is completed per the audit schedule.

The ISO Management Representative, in conjunction with the Lead Auditor, is responsible for ensuring that Corrective Action Notices are prepared for audit findings, as appropriate.

IV. Procedure

A. Audit Team Selection - One or more auditors comprise an audit team. When the team consists of more than one auditor, a Lead Auditor will be designated. The Lead Auditor is responsible for audit team orientation, coordinating the audit process, and coordinating the preparation of the audit report.

B. Audit Team Orientation - The Lead Auditor will assure that the team is adequately prepared to initiate the audit. Pertinent policies, procedures, standards, regulatory requirements and prior audit reports are made available for review by the audit team. Each auditor will have appropriate audit training, as defined by Procedure #.

C. Written Audit Plan - The Lead Auditor is responsible for ensuring the preparation of a written plan for the audit. The Internal EMS Audit Checklist may be used as a guide for this plan.

D. Prior Notification - The plant areas and / or functions to be audited are to be notified a reasonable time prior to the audit.

E. Conducting the Audit

1. A pre-audit conference is held with appropriate personnel to review the scope, plan and schedule for the audit.

2. Auditors are at liberty to modify the audit scope and plan if conditions warrant.

3. Objective evidence is examined to verify conformance to EMS requirements, including operating procedures. All audit findings must be documented.

4. Specific attention is given to corrective actions for audit findings from previous audits.

5. A post-audit conference is held to present audit findings, clarify any misunderstandings, and summarize the audit results.

F. Reporting Audit Results

1. The Team Leader prepares the audit report, which summarizes the audit scope, identifies the audit team, describes sources of evidence used, and summarizes the audit results.

2. Findings requiring corrective action are entered into the corrective action database.

G. Audit Report Distribution

1. The ISO Management Representative is responsible for communicating the audit results to responsible area and / or functional management. Copies of the audit report are made available by the ISO Management Representative.

2. The ISO Management Representative is responsible for ensuring availability of audit reports for purposes of the annual Management review (see Procedure #).

H. Audit Follow-up

1. Management in the affected areas and / or functions is responsible for any follow-up actions needed as a result of the audit.

2. The ISO Management Representative is responsible for tracking the completion and effectiveness of corrective actions.

I. Record keeping

1. Audit reports are retained for at least two years from the date of audit completion. The ISO Management Representative is responsible for maintaining such records.

Audit Plan

Area or Function to be Audited	Lead Auditor	Audit Team Members	Target Date	Special Instructions
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

Sample Communications to Audit Team

ENVIRONMENTAL MANAGEMENT SYSTEM AUDIT

Lead Auditor:

Audit Team Members:

Audit Area: Target Due Date:

Listed above is the area to be audited. The due date given is the target to have the entire audit completed, including the report and follow-up meeting with the responsible area management. Listed below are the areas of environmental management systems criteria that you are to assess. If you have any questions, please call me. Special instructions, if any, are listed below. Thank you for your help. Effective audits help make an effective environmental management system.

__ Policy

__ Environmental Aspect identification

__ Environmental Management Program

__ Training, Awareness, Competence

__ EMS Documentation

__ Operational Controls

__ Monitoring and Measurement

__ Records

__ Management Review

__ Legal and Other Requirements

__ Objectives and Targets

__ Structure and Responsibility

__ Communication

__ Document Control

__ Emergency Preparedness

__ Nonconformance / Corrective Action

__ Management System Audits

Special Instructions:

ISO Representative (signature)

Sample Procedure: Management Review

EMS PROCEDURE: MANAGEMENT REVIEW

I. Purpose

The purpose of this procedure is to document the process and primary agenda of issues to be included in the Management Review meetings for evaluating the status of the organization's environmental management system (EMS).

II. Scope

This procedure applies to all Management Review meetings conducted by the organization.

III. General

The Management Review process is intended to provide a forum for discussion and improvement of the EMS and to provide management with a vehicle for making any changes to the EMS necessary to achieve the organization's goals.

IV. Procedure

A. The ISO Management Representative is responsible for scheduling and conducting a minimum of two Management Review meetings during each 12-month period. The ISO Management Representative is also responsible for ensuring that the necessary data and other information are collected prior to the meeting.

B. At a minimum, each Management Review meeting will consider the following:

- suitability, adequacy and effectiveness of the environmental policy;
- suitability, adequacy and effectiveness of the environmental objectives (as well as the organization's current status in achieving these objectives);
- overall suitability, adequacy and effectiveness of the EMS;
- status of corrective and preventive actions;
- results of any EMS audits conducted since the last Management Review meeting;
- suitability, adequacy and effectiveness of training efforts; and,
- results of any action items from the previous Management Review meeting.

C. Minutes of the Management Reviews will be documented and will include, at a minimum the list of attendees, a summary of key issues discussed and any actions items arising from the meeting.

D. A copy of the meeting minutes will be distributed to attendees and any individuals assigned action items. A copy of the meeting minutes will also be retained on file.

Appendix B:

Information of EPA Performance Track

Appendix C:

Information of Process Mapping and

Design for Environment

Introduction to Process Mapping

Organizations operate using a collection of processes. A process can be defined as a method of doing something, generally involving a number of steps or actions. An EMS is one example of linked organizational processes that are directed at a specific purpose. Most organizations employ a variety of processes to carry out their core functions, such as manufacturing a product or providing a service.

A process typically has four components. Two of these are inputs (the items to which action is done) outputs (the results of those actions). In addition, a process has controls (which direct the action) and mechanisms (which are the resources that actually perform the action). Mechanisms can be people or machines that change the inputs to the outputs. Other concepts that are important to process mapping are process boundaries (which define the limits of a particular process from its larger environment), suppliers (who provide the process inputs) and customers (whoever receives the output of the process).

Process mapping is a tool that allows an organization to visualize and understand how work gets accomplished and how its work processes can be improved. It is a simple but powerful tool through which an organization can focus its efforts where they matter most and eliminate process inefficiencies. Used properly, process mapping can help an organization understand its environmental aspects and reduce wastes and pollution. It also can help an organization to reduce operating costs by identifying and eliminating unnecessary activities.

As an EMS tool, process mapping can help an organization to:

- **improve its understanding of existing processes**, including the key **inputs** (such as chemicals, raw materials and other resources used), **outputs** (including products, wastes, air emissions, etc.) and **interactions** with other processes.

- **identify areas for process improvement** that can result in environmental performance improvements (such as pollution prevention opportunities)

Over time, processes are often modified many times in seemingly small ways. Over time, these process modifications can result in a process that is ineffective. This is one of the bases for the concept of "re-engineering" which seeks to examine processes in a holistic manner to ensure they are effective and necessary to achieve an organization's mission.

Getting Started on Process Mapping

- **Select a process** (or set of related processes) to examine. Processes might be prioritized for review based on a number of criteria, such as relevance or importance to the organization, prior assessments of the process, existing knowledge of the environmental significance of the process, or history of problems with the process, among others. Define the process boundaries.

- Use a **team** to understand and map how these existing process(es) work. At a minimum, the team should include the process "owner" as well as individuals that are actively involved in carrying out the process. Many organizations use a facilitator that is independent of the process under review to manage team meetings. Don't be surprised if a diversity of opinions exists among team member exist regarding how the existing process works.

- **Clarify the objectives** of the process under review. Each process should have a primary customer and a primary performer, although additional (secondary) customers and performers also might exist.

- As a team, **determine the level of detail** needed to accurately map your processes. Initially, you might map at a fairly high level, then get into more detail as improvement opportunities as identified.

- Decide on a **set of symbols** that the team will use to visually describe the process. For example, use one symbol for work steps, another symbol for process inputs, a third symbol for process outputs, a fourth symbol for decision points, a fifth symbol for measurement points, etc.

- **Identify the key steps** (or "unit operations") in the process first, then go back and **analyze** each of these steps in more detail. Use lines or arrows to show the relationships among individual process steps. Use brainstorming and/or storyboarding techniques to identify the process steps, then agree upon the sequence of these steps.

- Start with the **preparation of an "as is" map** that describes how the process works now, including key process inputs to and outputs. For environmental purposes, key inputs might include energy and other resources consumed, and raw materials and chemicals used. Outputs might include products or services, air emissions, wastewater discharges, solid and hazardous wastes. This "as is" map can be analyzed to identify environmental aspects and key opportunities for improvement.

- Some processes can be extremely complex and might consist of numerous **sub-processes**. If the team gets bogged down, it might examine and map some of the key sub-processes first, rather than trying to tackle the entire process at once. As a rule of thumb: If the process is so complex that it cannot be shown on a single page, then it might be a good candidate for re-engineering.

- Depending on the purpose of the process mapping exercise, the analysis of the "as is" map can lead to the preparation of a **modified map** that defines how the re-engineered process is intended to function.

- A variety of **tools and materials** can be used to prepare process maps. For example, a number of commercial software packages exist. However, you can also employ simpler methods, such as self-sticking removable ("Post-It") note pads. These are particularly useful for moving individual process steps around on a board.

A **sample process map** for a printing operation is shown at the end of this section.

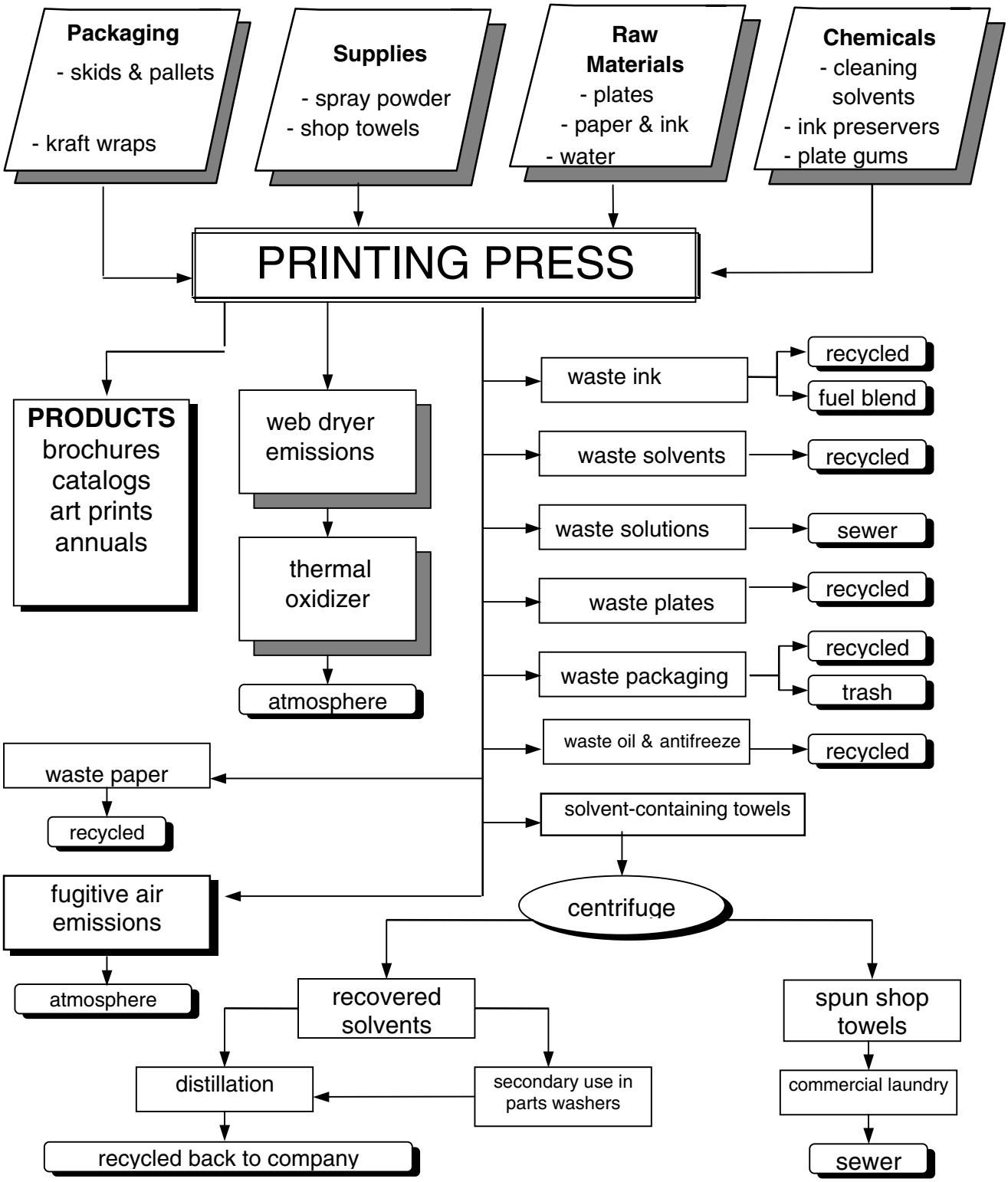
Conclusion

Process mapping can provide a solid foundation for understanding and continually improving an organization's processes.

Viewing processes graphically helps an organization to see things that otherwise might not be apparent. Once a process map has been prepared, it can be used as training tools as well as for internal and external communications.

Process mapping has several important benefits for an EMS. First, it allows an organization to understand its current environmental aspects and impacts as well as the specific operations and activities from which they arise. Second, it provides a basis for enhancing an organization's processes in a manner that can improve both environmental and financial performance.

Sample Process Map for Printing Operation



Information on Design for Environment

Every product or service has some impact on the environment. Such impacts can occur at many stages of the product or service's life cycle, from raw material acquisition to ultimate disposal or reuse. Just as the quality and performance characteristics of a product are significantly affected by decisions made at the development stage, so are the product's environment attributes. Consideration of potential environmental impacts throughout the product or service development process can improve both environmental and financial performance. By looking at each stage of a product or service life cycle, an organization can better understand and control the potential environmental impacts.

Design for Environment (DFE) is based on techniques for integrating environmental considerations into an organization's decisions concerning its products and services, as well as manner in which these products and services are generated. In involves an understanding of materials flows (and the environmental effects of such material flows) as well as the comparison of alternative approaches to producing a product or service.

DFE is grounded in the use of life cycle assessment to evaluate the full range of impacts associated with a product or service. Such life cycle assessments allow an organization to evaluate potential environmental impacts and identify opportunities to make improvements.

DFE is based on an assessment of the performance, costs and risks associated with alternatives. The technique seeks to encourage front-end innovation through product or service redesign, rather than reliance on "end of pipe" controls in order to manage risks to the environment. As such, use of the technique might result in redesign of a product formulation, a manufacturing process, or a management practice, among other possibilities.

In general, the earlier that environmental considerations are taken into account in the product or service development process, the more effective the results will be with respect to environmental performance. Organizations can use an approach that includes:

- Evaluating information on the environmental attributes of a product or service,
- Designing specific measures to reduce associated environmental impacts.
- Testing alternatives that seek to reduce impacts, while considering other importance product characteristics (such as quality and performance), and
- Applying the resulting "lessons learned" to subsequent product or service development.

While it might be simpler to implement DFE practices on new products or services, an organization also might find opportunities to apply DFE in their existing products or services. In conducting such evaluations, an organization could consider a number of goals, such as:

- Minimizing the use of toxic materials
- Minimizing compliance costs
- Avoiding chemicals that are banned or restricted by customers / other parties
- Minimizing packaging
- Minimizing energy use
- Minimizing use of water, other resources
- Maximizing reuse potential

A product or service's environmental impacts are largely based on the inputs used to make the product (or provide the service) and the outputs generated at various stages of its life cycle. An organization can start to apply DFE concepts by using a simple matrix to assess the environmental impacts associated with a product, such as shown below (1).

	Potential Environmental Issues				
Product Life Cycle Stages	Material Selection	Energy Use	Air Emissions	Water Discharges	Solid Wastes
Premanufacture (Product design)					
Product Manufacturing					
Product Packaging & Delivery					
Product Use					
Product Disposal or Reuse					

For many organizations, the effective application of DFE concepts involves working closely with their suppliers and customers. Effective communications with supply chain partners can be critical in ensuring that an organization's products or services satisfy all their performance needs (i.e., performance, durability, environmental, safety, cost, etc.)

More information on DFE can be obtained from a variety of sources (see Appendix F for additional information sources). In particular, organizations can access information on DFE tools and projects on EPA's DFE web site at *www.epa.gov/opptintr/dfe*.

(1) Adapted from "Best Current Practices: Design for Environment", Lucent Technologies, February 1997.

Appendix D:

Registration of Environmental

Management Systems

Appendix E:

Integration of Environmental Management Systems and Quality Management Systems

Integration of Management Systems

Integrating management systems has become an increasingly important competitive issue. A growing body of information indicates that organizations that integrate their EMS and quality management systems (QMS) can realize significant benefits, such as streamlined operations and decision-making, simplified employee training, more efficient of resources and reduction in audit costs. Systems for managing health & safety and other organizational functions can be similarly integrated.

The two most common models for QMS and EMS (ISO 9001 and ISO 14001, respectively) share many common elements. This should be no great surprise, since ISO 9001 was one of the source documents used by the drafters of ISO 14001. The two standards are very compatible in their current forms. The ISO committees responsible for the development and maintenance of these two standards continue to examine potential opportunities to increase the compatibility or alignment of the two standards.

Organizations that choose to implement both of these standards generally find that they can use many common processes to conform. In general, the elements of a QMS and an EMS can be categorized as either (1) essentially the same, (2) similar or (3) unique (see table below). System elements in both the "essentially the same" and "similar" categories can often be addressed by a common procedure (or parallel procedures), although some customization may be needed to address the differing overall purposes of these systems. Unique elements are typically dealt with in separate (EMS or QMS) procedures. Some of the typical elements for integration include: document control, corrective/preventive action, training, records management and management review. However, some organizations have gone much further – for example, some have developed common (quality and environmental) policies. The degree of system integration varies widely from organization to organization.

While an EMS can be readily integrated with an existing QMS, the overall purposes of these two systems must be kept in mind. A QMS is intended primarily to ensure that an organization satisfies its customers by assuring the quality of its products. An EMS generally has a broader context – the relationship between an organization and the environment in which it operates. Also, an EMS often concerns itself with a broader range of stakeholders, such as neighboring communities, customers and regulatory agencies.

System integration can have environmental benefits. By linking environmental management more closely with day-to-day planning and operation, some organizations have been able to raise the visibility of environmental management as a core organizational issue. In addition, these organizations enhance their abilities to address environmental issues when making modifications to products or processes for quality purposes.

Organizations that have a QMS in place generally are better off when implementing an EMS for several reasons. First, employees typically are already familiar with management system concepts and are involved in making the system work. Second, many of the processes needed for the EMS might already be in place. Finally (and perhaps most importantly), top management has committed the use of management systems to achieve organizational goals.

A Few Tips on System Integration

For organizations that have an existing QMS and wish to integrate an EMS with it, some suggestions are provided below.

- ☞ Understand the existing QMS, its effectiveness and how the workforce perceives the system. Is the existing QMS documentation clear and workable? Do employees believe that the system is helping the organization to achieve desired results?

- ☞ Ensure that the scope of the two systems will be consistent (i.e., that the systems will cover the same facilities, products, activities and/or services). In particular, this will be an important issue if third-party registration will be sought.

- ☞ Establish a cross-functional team (including, at a minimum, representatives from the environmental and quality functions) to determine the optimal approach to system integration.

- ☞ As needed, manage resistance to change. Some employees and managers may be reluctant to change a system that they are already familiar with and/or in which they have important roles.

- ☞ Understand how QMS and EMS differ in purpose. While there are many common management system elements, there are elements of each system that are unique (see below). In the case of EMS, these include for example, environmental aspects, communications, emergency preparedness and response. These differences must be acknowledged and accommodated within the integrated management system.

Relationship of EMS Elements to QMS (based on ISO 9001)

Elements that are Essentially the Same

- ☞ Training, Awareness & Competence
- ☞ Document Control
- ☞ Nonconformance, Corrective & Preventive Action
- ☞ Calibration (part of the Monitoring & Measurement element)
- ☞ Records

Elements that are Similar

- ☞ Environmental Policy
- ☞ Structure and Responsibility
- ☞ EMS Documentation
- ☞ Operational Control
- ☞ Monitoring & Measurement
- ☞ EMS Audit
- ☞ Management Review

Elements that are Unique

Environmental Aspects
Legal and Other Requirements
Objectives & Targets
Environmental Management Program(s)
Communications
Emergency Preparedness & Response

- Modify system documentation as required. Keep procedures simple and clear for users. Review proposed changes with affected managers and employees.

- On a procedure-by-procedure basis, consider whether to integrate procedures or keep them separate. While integration can reduce the total number of procedures or work instructions, it also can confuse the overall purpose of such procedures in some cases.

- Once the integrated system documentation has been prepared, train managers and employees on the integrated system.

- Audit the integrated system and take actions as necessary.

A few final thoughts on system integration:

- Can your organization afford to have two or more separate systems?

- Are there compelling reasons to keep these systems separate?

- What is the optimal approach from a strategic and operational standpoint?

- What approach is best suited for the organization's change and growth?

Some Linkages Between ISO 9000 and ISO 14001

ISO 9001 Quality Management Systems	ISO 14001 Environmental Management Systems
Quality Policy	Environmental Policy
Resources	Resources
Organization	Structure & Responsibility
Training	Training
Management Representative	Management Representative
Process Control	Operational Control
System Documentation	System Documentation
Document Control	Document Control
Inspection & Testing	Monitoring & Measurement
Corrective & Preventive Action	Non-conformance and Corrective & Preventive Action
System Audits	System Audits
Management Review	Management Review

* ISO 9001: *Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation and Servicing.*

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Note: *This table does not represent a comprehensive comparison of ISO 9001 and ISO 14001.*

Appendix F:

Additional Sources of Information and Contacts

Appendix F: Additional Sources of Assistance

There are many resources available to help your organization develop and implement an EMS that are free of charge or relatively inexpensive. The following is a description of some of these resources.

Federal Government Agencies

The U.S. **Environmental Protection Agency** (USEPA) provides information on a number of topics that can be useful in the development and implementation of an EMS. Some of these resources include: assistance with interpretation of environmental laws and regulations; information on pollution prevention technologies (case studies and fact sheets); and hotlines to answer questions about environmental issues. The Agency also has web sites for information on EMS and Design for Environment. The USEPA's Office of Compliance has established national Compliance Assistance Centers for various industry sectors.

The **Small Business Administration** (SBA) provides assistance to small and medium-sized organizations. The SBA can provide information and assistance related to: operation and management of a business; sources of financial assistance; international trade; as well as laws and regulations.

State Agencies

Your state environmental regulatory agency can provide assistance with the development of an EMS. Contact your state environmental agency and inquire about education and outreach programs for organizations that are developing an EMS. Many state environmental agencies also can provide publications, pamphlets, and on-line help related to state environmental laws, innovative pollution prevention technologies, waste reduction, and permitting. Some states (such as North Carolina, Wisconsin and Virginia) have developed programs to help organizations implement and EMS and/or seek ISO 14001 registration. Recently, several states (including Texas and Virginia) established "EnviroMentor" programs within their Small Business Assistance Offices. These mentoring programs are intended to help small companies comply with regulations.

Associations

Industry trade associations can provide assistance with the development of an EMS. These organizations can provide information on industry-specific environmental management issues, and can put you in contact with other organizations that can share their experience and expertise in EMS implementation.

Colleges and Universities

Some colleges and universities provide EMS-related training or manage EMS demonstration projects.

Chambers of Commerce

Your local or state chamber of commerce might be helpful in providing information about legislative and regulatory issues that affect environmental management for small and medium- sized organizations. Other services that are commonly offered include handbooks, workshops, conferences and seminars.

Non-Profit Organizations

Another resource to consider is the Manufacturing Extension Partnership (MEP), which is a growing nationwide system of services that provide technical support to businesses interested in assessing and improving their current manufacturing processes. The MEP is a partnership of local manufacturing extension centers which typically involve federal, state, and local governments, educational institutions, and other sources of information and funding support. The MEP can also often provide assistance with quality management, development of training programs and business systems.

The Industrial Technology Institute (ITI) is a non-profit organization dedicated to expanding technology access and technology management among U.S. manufacturers. ITI provides technical assistance to small and medium-sized organizations through the Michigan Manufacturing Technology Center. ITI also has experience with the development of business performance tools and provides services for energy, environment, and manufacturing assessments; as well as, QS 9000 and ISO 14000 training and implementation.

Other Organizations

Another recommended source of information and expertise is the organizations with which you do business. It is likely that your suppliers and customers have experience with many of the aspects of an EMS, and might be willing to share their experiences and provide advice to your organization.

On-line Resources

There is a wealth of information related to EMS implementation available electronically via the Internet. Many state, federal, and local agencies have home pages on the Internet containing information that can be useful to your organization. Numerous non-governmental organizations have home pages that contain information on topics such as ISO 14000, pollution prevention, recycling and waste minimization, environmental laws and regulations, innovative manufacturing technologies, and materials substitution. If your organization does not have Internet access, contact your local library to see if it provides Internet access to users.

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Additional EMS resources and contacts are described on the following table.

Appendix F (cont'd.)

Additional Sources of Information and Contacts

Note: This list is not intended to be comprehensive. Appearance on this list should not be construed as an endorsement by NSF of any products/service.

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
US Environmental Protection Agency	Small Business Compliance Assistance Centers:	202/564-7066 (general information)	Centers are Internet Web Sites with comprehensive environmental compliance, technical assistance, & pollution prevention information for various industry sectors.
	Pollution Prevention Clearinghouse	202/260-1023	Technical Information on materials and processes, including publications related to waste minimization and pollution prevention.
	Public Information Center	202/260-7751	General information about EPA programs.
	RCRA / Superfund Hotline	800/424-9346 202/382-3000	Provides information about hazardous waste regulations and handles requests for federal documents and laws.
	Small Business and Asbestos Ombudsman	800/368-5888 202/557-1938	Information and advice on compliance issues for small quantity generators of hazardous waste.
	Technology Transfer and Support Division	513/569-7562	Access to the Office of Research and Development research information and publications.
	TSCA Hotline	202/554-1404	Assistance and guidance on TSCA regulations.
	Enviroene	http://es.inel.gov/	Solvent alternatives, international, federal and state programs, other research and development. Also, environmental profiles of various industrial categories.
	US EPA Home Page	http://www.epa.gov	Information about EPA regulations, initiatives, and links to the home pages of other governmental agencies and EPA regional offices.

FEDERAL AGENCIES			
U.S. Small Business Administration	SBA Answer Desk	1-800-8-ASK-SBA	Information about SBA programs, and telephone numbers for local offices.
	SBA Home Page	http://www.sbaonline.sba.gov/	Information about business services available to your organization, with links to other related sites.
Government Printing Office	GPO Superintendent of Documents	202/512-1800	Information about available documents and instructions on ordering GPO publications.
US Department of Energy	Pollution Prevention Information Clearinghouse	http://www.er.doe.gov/production/esh/epic.html	Pollution prevention and environmental design information.

STATE AGENCIES			
Organization	**Resource**	**Telephone Number / Internet Address**	**Description**
State Environmental Protection Agencies	Environmental Assistance Programs	Contact your state's Environmental Protection Agency	Many state environmental protection agencies provide publications, technical assistance, and information on pollution prevention technologies, waste reduction, and regulatory compliance, at little or no charge.
	Small Business Assistance Programs (Mandated under Title V of the Federal Clean Air Act).	Call the EPA Small Business Ombudsman (800/368-5888) for the phone number and address of the Small Business Assistance Program in your state.	Provides information and technical assistance to small businesses regulated under the Clean Air Act.
	State and Local Pollution Prevention Programs	Contact the National Pollution Prevention Roundtable (202/466-7272) for the phone number and address of the pollution prevention program in your state.	Provides information and technical assistance on pollution prevention.
State Environmental Protection Agencies (cont'd)	Michigan Department of Environmental Quality	http://www.deq.state.mi.us	Fact sheets, training, and technical assistance.
	Minnesota Technical Assistance Program	http://es.inel.gov/techinfo/facts/mpca/mpca.html	Fact sheets on pollution prevention, materials substitution.

STATE AGENCIES			
Organization	**Resource**	**Telephone Number / Internet Address**	**Description**
	Ohio Department of Environmental Protection	http://arcboy.epa.ohio.gov	Fact sheets on pollution prevention, materials substitution.
	Wisconsin Department of Natural Resources	http://es.inel.gov/techinfo/facts	Fact sheets on pollution prevention, materials substitution.

Note: The list shown above represents only a sample of the resources that may be available from state agencies. Contact your state agency for details of existing programs and other forms of assistance available

EMS SOFTWARE PACKAGES		
Organization	**Contact Info**	**Description**
Greenware	1-800-474-0627 www.greenware.com	Provides ISO 14001 assessment, implementation and audit software
EMSoft2000	1-800-241-3618 www.rmtinc.com	Software package based on LotusNotes to support EMS implementation
ISOXpert	1-800-ISO-EASY	Built on LotusNotes platform. Customizable document formats.
ISOSoft 14001	416-679-0119 www.isogroup.simplenet.com/soft14k	Provides ISO 14001 assessment, implementation and audit software. Co-developed with BSI.

NON-PROFIT ORGANIZATIONS			
Organization	**Address**	**Phone Number**	**Description**
Industrial Technology Institute (ITI)	2901 Hubbard Road P.O. Box 1485 Ann Arbor, Michigan 48106-1485	1-800-292-4484 Fax: 1-313-769-4064	Technical assistance to small and mid-sized manufacturers. Energy, environment, and manufacturing assessments, as well as performance benchmarking, and QS 9000 and ISO 14000 implementation assistance.
Manufacturing Extension Partnership (MEP)	Building 301, Room C121 National Institute of Standards and Technology Gaithersburg, Maryland 20899-0001	1-301-975-5020 1-800-MEP-4MFG Fax: 1-301-963-6556	Assists manufacturers with assessing technological needs, and works to help small manufacturers solve environmental problems with cost-effective solutions.

INTERNET RESOURCES

Resource	Internet Address	Description
ANSI Online	http://www.ansi.org	Contains information related to the American National Standards Institute, including meetings, events, and standards information databases.
Business Resource Center	http://www.kciLink.com/brc	Provides information on a variety of topics, including tips on management, recycling, and financing.
Canadian Standards Association	http://www.csa.ca/isotcs	A center for information and services related to ISO 9000 and ISO 14000, maintained by the Canadian Standards Association.
Clean Technologies Center (UCLA)	http://cct.seas.ucla.edu	Innovative technologies for pollution prevention.
Consortium on Green Design and Manufacturing (UC-Berkeley)	http://euler.berkeley.edu/green/cgdm.html	Environmental design and sustainable development.
Environmental Technology Gateway	http://iridium.nttc.edu/environmental.html	Access to other environmental links and information, environmental technologies.
International Corporate Environmental Reporting Site	www.enviroreporting.com	International news about environmental issues and resources for environmental reporting.
Industrial Technology Institute Home Page	http://www.iti.org	Information about ITI, how to find environmental information on the Internet, and links to other organizations.
International Network for Environmental Management	www.inem.org	Case studies, publications and how-to information on environmental management. Interactive tools for assessing environmental policies and reports.
ISO 14000 Information Center	http://www.iso14000.com	Answers to questions on ISO 14000 standards.

INTERNET RESOURCES

Resource	Internet Address	Description
ISO 14000 Integrated Solutions (ANSI/GETF)	http://www.gnet.org	Will provide training, conferencing, on-line information services and publications on a fee basis.
ISO Online	http://www.iso.ch	The ISO homepage provides information on ISO, its structure, members, technical committees, meetings, and events.
Multi-State Working Group	www.mswg.org	Describes the activities of this group regarding EMS and ISO 14001.
National Environmental Information Resources Center (NEIRC)	http://www.gwu.edu/~greenu/	Provides access to a wide variety of information about environmental matters, with links to hundreds of organizations.
NSF Home Page	http://www.nsf.org	Contains information on NSF International and its pilot projects in EMS implementation.

AUTHORIZED SOURCES OF THE ISO 14000 STANDARDS

NSF International (NSF)	Phone: 1-800-NSF-MARK Fax: 1-313-769-0109	P.O. Box 130140 Ann Arbor, MI 48113-0140
American National Standards Institute (ANSI)	Phone: 1-212-642-4900 Fax: 1-212-398-0023	11 West 42nd Street New York, NY 10036
American Society for Quality Control (ASQC)	Phone: 1-414-272-8575 Fax: 1-414-272-1734	Milwaukee, WI
American Society for Testing and Materials (ASTM)	Phone: 1-610-832-9585 Fax: 1-610-832-9555	West Conshohocken, PA

Glossary of Acronyms

ANSI	American National Standards Institute
API STEP	American Petroleum Institute's "Strategies for Today's Environmental Partnership"
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERES	Coalition for Environmentally Responsible Economies
CFCs	Chlorofluorocarbons
CMA	Chemical Manufacturers Association
CWA	Clean Water Act
DFE	Design for Environment
EHS	Environment, Health and Safety
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
EPA	(Also USEPA) U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
HMTA	Hazardous Materials Transportation Act
ICC	International Chamber of Commerce
ISO	International Organization for Standardization
ITI	Industrial Technology Institute
MEP	Manufacturing Extension Partnership
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
P2	Pollution Prevention
QMS	Quality Management System
RCRA	Resource Conservation and Recovery Act
SBA	U.S. Small Business Administration
SPCC	Spill Prevention Control and Countermeasure
TC 207	Technical Committee 207 (of ISO)
TSCA	Toxic Substances Control Act
TQM	Total Quality Management
USTAG	U.S. Technical Advisory Group (to TC 207)
VOCs	Volatile Organic Compounds

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